

Emergency Health  
*and*  
Sanitation Activities  
*of the*  
Public Health Service  
*during*  
World War II



**PUBLIC HEALTH BULLETIN NO. 302**

**FEDERAL SECURITY AGENCY • Public Health Service**

PHS Historian

NATIONAL LIBRARY OF MEDICINE  
Bethesda, Maryland



Office of t

Emergency Health  
*and*  
Sanitation Activities  
*of the*  
Public Health Service  
*during*  
World War II

*by*

Joseph W. Mountin, *Assistant Surgeon General*

Edward B. Kovar, *Social Science Analyst*

*Public Health Service*

UNITED STATES  
GOVERNMENT PRINTING OFFICE  
WASHINGTON : 1949

FEDERAL SECURITY AGENCY

Oscar R. Ewing, *Administrator*

PUBLIC HEALTH SERVICE

Leonard A. Scheele, *Surgeon General*

BUREAU OF STATE SERVICES

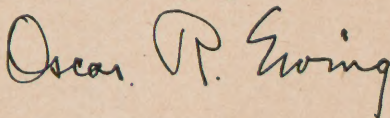
C. L. Williams, *Chief*



## FOREWORD

Emergency health and sanitation activities conducted by the Public Health Service during World War II were factors, as the record herein demonstrates, of appreciable importance in the Nation's total defense effort. These activities, however, constituted only one phase of the wartime program carried out by the Federal Security Agency—a program to which all constituent bureaus of the Agency made noteworthy contributions.

This wartime program, far from being a sharp departure from the Agency's normal peacetime work, was intimately related to the latter. Actually, the emergency activities of the Public Health Service as well as those of other units of the Agency represented an attempt to adapt to the necessities of war the basic program of the Federal Security Agency: maintenance and improvement, in collaboration with State and local governmental authorities, of the social, physical, and mental well-being of the American people.

A handwritten signature in dark ink, reading "Oscar P. Ewing". The signature is written in a cursive style with a large, prominent "O" and "E".

*Federal Security Administrator.*



## Preface

Early in the emergency period before American participation in World War II, State and Territorial authorities were faced with urgent health problems, stemming from the vastly increased emphasis on defense activities that characterized the period. Large-scale shifts of population—particularly among military personnel and industrial workers—began to occur as the preparedness effort took shape. In many areas of the United States, sudden influxes of thousands of war workers and members of the armed forces strained existing health facilities to the utmost. Although State health officials made strenuous attempts to prepare for and cope with these migrations, it soon became apparent that in most cases their resources were insufficient to meet the situation unaided. National health standards might have declined materially as a result of these movements of population had not the Federal Government, through the Public Health Service, come to the assistance of seriously overburdened State health departments.

Almost immediately following the proclamation of the emergency, the Public Health Service, aware that State and local health facilities might prove inadequate to meet the requirements of the national defense effort, swung into action with a program of emergency health and sanitation activities. The broad purpose of this program was to prevent deterioration of the Nation's general health status under the impact of defense preparations.

Initially, Service officers conferred with officials from various governmental agencies concerned in one way or another with wartime health problems. On the basis of these conferences, the Service prepared the organizational framework for a vigorous Nation-wide program of emergency health and sanitation activities. Essential to the preparation of such a program was a first-hand knowledge of typical problems facing local health authorities in the country's strategic military and industrial areas. To obtain this necessary knowledge, the Service undertook a series of community health surveys. Local deficits in health and sanitation facilities revealed by these surveys were then analyzed by experts within the Service, and steps initiated to overcome or ameliorate them.

One of the greatest obstacles faced by the Service in carrying out its emergency health and sanitation program was a shortage of trained health personnel. As the war continued, personnel shortages

became increasingly acute. The Service was able, however, to hurdle this obstacle to some extent by recruiting new professional personnel, giving them short but intensive orientation courses, and assigning them to duties in local communities.

In extramilitary and war industry areas, the Service, through its district offices, coordinated its efforts with those of State and local health departments to create a network of emergency health services for the protection of industrial workers, military personnel, and the general public. Maintenance of adequate health services within military and naval reservations themselves remained the responsibility of the armed services, but officials of these services cooperated wholeheartedly with local civilian authorities and the Public Health Service in furthering the objectives of the emergency health and sanitation program.

By combining in their proper proportion the elements of careful planning, intelligent cooperation, and hard work, the Service was able to carry out successfully this vast wartime campaign of disease prevention. The success of the campaign can be measured by the fact that the general health of the Nation was maintained, throughout the war years, at approximately its prewar level despite shortages of health personnel and facilities and the extraordinary demands placed upon those which were available. Preservation of national health standards during the war was not only an important achievement in itself; it also represented a substantial contribution to the victory of the United States and its allies. Epidemics of communicable disease or widespread illness of other types in this country—particularly among industrial workers—might have had a seriously adverse effect on the flow of vital war equipment to strategic battle areas.

All activities conducted by the Public Health Service in connection with the emergency health and sanitation program, it should be emphasized, were undertaken in close cooperation with State and local health authorities. The Service conceived of its primary function in the program as that of assisting these authorities to solve their own health problems; consequently, it did not attempt to administer particular phases of the program directly at State and community levels. It placed its resources—in the form of funds, personnel, and technical skills—at the disposal of State and local health agencies, leaving largely to the latter the task of determining how these resources might be used to the best possible advantage within specific areas. The achievements of State and local health officials in the face of tremendous odds were responsible, to a great extent, for the successful operation of the emergency health and sanitation program as a whole.

Needless to say, the wartime efforts of the Public Health Service to maintain the health of the American people were not limited to these emergency measures alone. By no means all the resources of the Service were channeled specifically into emergency health and sanitation activities during the war years. The Service's regular programs were continued at full scale throughout these years, while some were even expanded. These regular programs were the basic elements of the Federal Government's wartime activities in the health field. The main function of the emergency measures undertaken by the Service was to supplement the work of these programs in zones with particularly grave health problems.



# Contents

	Page
BACKGROUND OF THE EMERGENCY HEALTH AND SANITATION PROGRAM.....	1
GENERAL PATTERN OF THE PROGRAM.....	7
Administrative aspects.....	7
Community surveys.....	10
Examples of problem areas surveyed.....	12
Orientation and training.....	15
Assignment of personnel.....	17
Role of district offices.....	18
SPECIFIC PHASES OF THE PROGRAM.....	20
Malaria control and related activities.....	20
Plague control in Hawaii.....	37
Typhus fever control.....	38
Industrial hygiene activities.....	39
Tuberculosis control.....	43
Establishment of blood banks.....	45
The Lanham Act.....	46
Boulder City hospital.....	52
Liberian Health Mission.....	53
Water and food sanitation.....	55
Venereal disease control in the Caribbean.....	58
Health education.....	59
Provision of health care in war housing projects.....	60
Cooperation with the Public Roads Administration.....	61
Cooperation with the Office of Civilian Defense.....	63
Miscellaneous services to Federal agencies.....	65
RELATED WARTIME HEALTH PROGRAMS.....	67
Relocation of medical personnel.....	67
Evacuation of Japanese-Americans.....	68
Control of venereal disease.....	69
Disposal of surplus property.....	78
Employment counseling.....	79
SUMMARY.....	80

	Page
APPENDIXES.....	82
A. Emergency health and sanitation sections of appropriation acts.....	82
B. Appropriations and expenditures for emergency health and sanitation activities.....	87
C. Assignments of emergency health and sanitation personnel.....	91
D. Statistical data, Office of Malaria Control in War Areas.....	93
E. Program of classes, sixteenth wartime orientation course conducted by the Public Health Service, July 7 to August 3, 1944.....	94

# Background of the Emergency Health and Sanitation Program

When President Franklin D. Roosevelt proclaimed a state of limited national emergency in the United States, upon the outbreak of war in Europe in September 1939, the U. S. Public Health Service, like most other Federal agencies, was faced with the necessity of immediately adapting its numerous functions to the national preparedness program. Aware that the preservation of national health was one of the key factors in the defense program, the Service began, as soon as the emergency was declared, to draw up plans for carrying out its numerous wartime responsibilities. As the Federal agency most directly charged with helping to safeguard the Nation's health, it had the job of insuring maintenance, throughout the country, of normal standards of public health despite dislocations of industry and population caused by the shift from a peacetime to a war-geared economy. To the States Relations Division of the Service, then known as the Division of Domestic Quarantine, fell the major task of assisting States and local communities to organize effective emergency health and sanitation programs.

Even before the United States had actually become involved in the "shooting" phase of the war, it had become clear that emergency health and sanitation measures would need to be taken within States and local communities. As the preparedness program increased in tempo, many local health authorities found their facilities seriously strained by the additional population which construction of troop encampments and new industrial plants usually brought streaming into their communities. Some small towns and rural districts, lacking organized health departments, were totally incapable of solving health problems brought on, almost overnight, by the influx of large numbers of people into the extracantonment and war-industry zones established within their boundaries. Other communities, with only limited health facilities, found it almost as difficult to provide for the health needs of suddenly inflated populations.

---

The authors are indebted to Miss Marjory Steel of the States Relations Division for her work in assembling and collating most of the basic data used in the preparation of this report.

New restaurants and cafes sprang up in such communities to feed and entertain the increased population, both military and civilian. Often, their owners were very negligent about applying rules of milk and food sanitation; nor did local authorities have sufficient personnel available to enforce these rules.

Sewage and garbage disposal systems which had been organized to take care of several thousand people were unequal to the task of providing for tens of thousands. In such circumstances, the danger of the spread of communicable diseases became acute.

Community water-supply systems became polluted by the wastes of giant new war plants but, in many cases, there were no adequate inspection procedures or methods of purification established locally.

Large military camps were often built in areas endemic for malaria-carrying mosquitoes, but health authorities in these areas quite frequently had neither personnel nor equipment to combat the menace of a possible malaria epidemic among both troops and civilians. Some of these camps, housing thousands of soldiers, grew up near tiny towns whose normal recreation facilities were completely inadequate to accommodate the hundreds of men who would flock into town on week-end passes. Inevitably, venereal disease became a serious hazard in many such towns for the first time in their history.

Faced with such overwhelming problems, health officials of areas in the neighborhood of military installations and war-industry plants turned to their State health departments for assistance. In many cases, however, their difficulties were too great even for State health authorities to overcome, and the aid of the Federal Government was sought. Gradually, therefore, assisting States and local communities to solve health problems caused by the Nation-wide impact of the national defense program became a major duty of the U. S. Public Health Service during the period of national emergency and the war years that followed.

The Service was well qualified for this duty. It had, since the passage of the Social Security Act of 1935, administered on a national scale the system of Federal grants-in-aid to the States for general health purposes authorized by title VI of that act. Since 1938, it had also been carrying out an extensive grant program for control of venereal diseases. The Service had learned, through managing these grant-in-aid programs, that it was sound policy to allow the States and their political subdivisions to do most of the actual job of effectuating at local levels health programs of national scope; it had come to the conclusion that the role of the Federal Government in such programs should be limited, in general, to providing friendly counsel and to supplementing local resources, when necessary, with Federal funds, personnel, and equipment. These principles were scrupulously

adhered to by the Service in carrying out its emergency health and sanitation program.

For the program's actual content, officials of the Public Health Service drew upon precedents established during World War I. The Service had carried out similar emergency health responsibilities during that period and its files contained a record of much of the experience gained; this experience was of invaluable help to Service officers who were charged with formulating plans to meet the new emergency.

The annual reports of the Surgeon General published during the period of the First World War, for example, were particularly useful in this connection.

The full impact of the First Great War, of course, had not reached the country at large until 1918 and it was, therefore, the Surgeon General's Annual Report for Fiscal Year 1919, detailing the Service's first full year of wartime activities, which was most relevant to the 1939 situation. In this report, the point was emphasized that local health authorities needed assistance from the Federal Government if they were to carry out adequately the dual job of protecting inhabitants of military encampments against health hazards existing in surrounding civilian communities and, at the same time, safeguarding civilian populations against sources of infection represented by large bodies of troops crowded into nearby camps. The policy followed by the Federal Government, through the Public Health Service during World War I in assisting State and local health departments to accomplish both these objectives is well illustrated by the following passage from the 1919 report:

\* \* \* It has been the policy of the Service to cooperate to the utmost extent possible with the local agencies and to supply only sufficient personnel to meet the increased emergency conditions. \* \* \* In all the extracantonment zones where the Public Health Service exercised supervision or control, the officer in charge was clothed with State and local health authority in order to enforce necessary legislation pertaining to general sanitation. Practically without exception it was found that the health machinery in the different zones was wholly inadequate to meet the increased demands suddenly imposed. Therefore it was necessary to establish an adequate system of disease control and prevention and to strengthen the health organization by supplying the necessary expert supervision, or in those cases where no organization was present, to supply an organization sufficient to meet the needs of the local situation.<sup>1</sup>

The policy followed by the Service in carrying out its emergency activities during the Second World War was essentially the same as that enunciated in the 1919 report.

Few funds were available for special health and sanitation work during the early period of the 1939 emergency. It was necessary, at

---

<sup>1</sup> Annual Report of the Surgeon General of the Public Health Service of the United States for the Fiscal Year 1919, U. S. Government Printing Office, Washington, 1919; pp. 86-87.

first, for the States to curtail some of their normal health programs so that money from their regular appropriations could be furnished for emergency health activities. Despite lack of funds, the Service began, as soon as possible after the President's proclamation, to send its officers into proposed and newly established contonment zones to make surveys of existing health and sanitation facilities. On the basis of these surveys, recommendations were made to the States for adoption of emergency health measures essential to the protection of military installations and civilian communities in their vicinity. The results of these surveys were kept in an active file in the hope that, when more funds became available, Service personnel could begin to participate more vigorously in combating health hazards in specific cantonment areas.

That there was throughout the Nation great need for special health and sanitation activity was recognized early in the emergency period by many high-ranking Government officials. For example, Secretary of War Harry H. Woodring wrote as follows, in a letter sent to Federal Security Administrator Paul V. McNutt on January 30, 1940:

I am writing in this time of limited emergency to request that the United States Public Health Service again afford to the Army the fine cooperation and support it gave during the World War under the provisions of law and the Executive Order of April 3, 1917.

It is desired that the U. S. Public Health Service, operating under the authority of existing laws and using its own resources, cooperate with the Army in safeguarding the health of military personnel by suitable measures of extra-military area sanitation in connection with the present concentration of troops in the South. This cooperation is particularly desired at this time in regard to the increase in venereal disease which has been traced directly to organized vice in adjacent municipalities. Other matters of environmental sanitation will arise during the course of the coming maneuvers in which the U. S. Public Health Service can be of great assistance to the Army.

Without a special appropriation, however, it was impossible for the Public Health Service to put its emergency health and sanitation plans into efficient operation. These plans required, among other things, purchase of new equipment; initiation of detailed and intensive surveys of local needs; recruitment and training of personnel; and provision of transportation facilities and travel funds for Service personnel assigned to work in local areas. Such activities could not be adequately financed from regular Public Health Service appropriations for fiscal year 1940-41. The Service decided, therefore, as 1940 drew to its close and American involvement in the war began to appear imminent to many persons, to ask Congress for a special deficiency appropriation so that a comprehensive emergency health and sanitation program could be inaugurated.

During the initial stages of World War I it had been difficult for the Service to obtain money for emergency health and sanitation activities; without timely financial assistance from the American Red Cross, according to the annual report of the Surgeon General for 1919, the Service's extracantonment work "would have been greatly hampered" and could not have been instituted "on an extensive scale" until July 1, 1918. It was not until this date—15 months after the United States had entered the war—that an appropriation for emergency health activities was authorized.

But events moved much more rapidly in 1941. An urgent deficiency appropriation act was passed on March 1—shortly before President Roosevelt declared that an "unlimited national emergency confronts this country"—containing the following grant of emergency authority to the Service:

Public Health Service, emergency health and sanitation activities, 1941: For all expenses necessary to enable the Surgeon General of the Public Health Service to assist State and local health authorities in health and sanitation activities (1) in areas adjoining military and naval reservations, (2) in areas where there are concentrations of military and naval forces, (3) in areas adjoining Government and private industrial plants engaged in defense work; and to provide emergency health and sanitation services in Government industrial plants engaged in defense work and in areas adjoining United States military and naval reservations outside of the United States; such expenses to include personal services in the District of Columbia and elsewhere, purchase, exchange, maintenance, and operation of passenger-carrying automobiles, stationery, travel, printing and binding, and items otherwise properly chargeable to the appropriation for miscellaneous and contingent expenses of the Public Health Service, fiscal year 1941, \$525,000.<sup>2</sup>

This initial appropriation was certainly not a large one, but it was sufficient to enable the Public Health Service to activate its co-ordinated emergency health plan and to broaden the scope of the special programs it had already undertaken with whatever funds it could find.

After Pearl Harbor, all the local health problems which the Service, in cooperation with State health departments, had been attempting to solve since 1939 were immediately intensified. New industrial plants were established at a faster rate as the Nation began pouring out ever-increasing quantities of war materials, and the rate of induction of members of the armed services was greatly speeded up. In addition, State and local health departments, often inadequately staffed to begin with, began to lose many of their trained people to the Army and Navy. Thus, as problems of local health and sanitation grew more and more acute, personnel available to cope with them began to decrease markedly in numbers.

<sup>2</sup> The texts of appropriation acts and other legislation dealing with emergency health and sanitation activities are contained in appendix A.

The national shortage of public health personnel soon threatened to reach critical proportions, and the Service attempted to meet this situation by stepping up its assistance to State and local health agencies so that they would be able to carry out their wartime health and sanitation responsibilities. Throughout the war years, this cooperation between Service personnel and State and local health department officials continued and contributed signally to the eventual success of the country's military effort.

# General Pattern of the Program

## *Administrative Aspects*

A large part of the emergency health and sanitation program was administered by Public Health Service personnel with temporary job status; most of them were either reserve officers in the Commissioned Corps of the Service or wartime civil-service appointees. After having joined the Service, they went through a period of orientation at its headquarters in Washington, D. C., and were then assigned to State and local areas in need of emergency assistance. While working in such areas, Service personnel acted, for all practical purposes, as employees of the respective State or local government agencies to which they were assigned.

Whereas the headquarters office of the Public Health Service was largely responsible for recruiting and training emergency health and sanitation personnel, the district offices of the Service, in collaboration with State health authorities, usually assigned these personnel to duties in local areas and supervised them on the job.

As the emergency health needs of local areas expanded after Pearl Harbor, the Public Health Service had to extend its range of activities to keep pace with growing demands for assistance made upon it by State health officials. Additional sections were set up within the States Relations Division, which was handling the major share of emergency health and sanitation activities for the Service. Among the specialized functions for which new sections were needed were control of tuberculosis, malaria control, and construction of local hospitals and other health and sanitation facilities. The Tuberculosis Control and Hospital Facilities Sections of the Division were later raised to the rank of divisions in their own right within the Bureau of State Services, while the Office of Malaria Control in War Areas, in Atlanta, Ga., developed eventually into a communicable disease center.

In addition to the States Relations Division, other subdivisions of the Service, such as the Industrial Hygiene Division, the Venereal Disease Division, and the National Institute of Health, were charged with responsibilities of an emergency nature during the war period.

## Expenditures

Following Pearl Harbor and active involvement of the United States in the war, the efforts of the Public Health Service to maintain peacetime health standards were generally recognized as an essential contribution to the Nation's military potential. As the war progressed, therefore, appropriations for the emergency health and sanitation program were increased from year to year.

Only \$525,000 had been allocated for the program, initially, during fiscal year 1941;<sup>3</sup> this had been raised to \$4,470,000 for fiscal year 1942. For 1943, however, when the United States had become a fully participating member of the Allied coalition against the Axis Powers, \$9,702,200 was authorized by Congress for emergency health activities. For 1944, \$11,679,000 was appropriated for this purpose, and for 1945, \$11,870,034. After VE-day, funds for the program were cut sharply, only \$1,913,339 being authorized for fiscal year 1946, at the end of which the Service suspended health and sanitation activities of an emergency nature.

The money thus appropriated was spent by the Service on many widely varied projects which will be described later in detail.<sup>4</sup> All of them, however, were within the general framework of an emergency health and sanitation program, and common to all of them was a single major objective—maintenance of the public health at a high level so that the Nation's human resources could be most effectively mobilized for the war effort.

Although the Federal venereal disease control program continued to be provided for, during the period of the national emergency and the war years that followed, under the regular appropriation for the Venereal Disease Division of the Service, the Division devoted itself throughout this period largely to case finding and control activities related to the war effort, concentrating its work in extracantonment and war industry areas. It was in these areas that, as a result of war-time population shifts, there existed the greatest danger of a rapid spread of venereal infection.

Indicative of the importance attached to the role of the venereal disease control program in the national defense effort was the fact that for fiscal year 1942 the Venereal Disease Division received a substantial increase in its appropriation to \$8,750,000, from the \$6,200,000 it had been allotted in 1941. In 1943, after the United States had entered the war, the Division's appropriation was raised another \$3,750,000, bringing it to \$12,500,000. Thereafter, until the end of the war, the amount of money appropriated annually to the Division

<sup>3</sup> For the period from March 1 to June 30, 1941, only.

<sup>4</sup> Tables showing in detail, by fiscal years, amounts appropriated and expended for emergency health and sanitation activities during the war period are included as appendix B.

slowly declined—to \$12,367,000 in 1944, to \$12,339,000 in 1945, and to \$11,949,000 in 1946, exclusive of funds granted to it for that year for operation of rapid treatment centers. In addition to these amounts, however, Federal funds totaling \$15,878,082 were appropriated, under the Lanham (Community Facilities) Act (55 Stat. 361.),<sup>5</sup> for construction, operation, and maintenance of venereal disease rapid treatment centers in numerous communities throughout the Nation during fiscal years 1944–46. The Venereal Disease Division cooperated with State and local health departments in setting up these centers.

### Liaison Officers

In order that efforts of all officials—Federal, State, and local—concerned with health conditions in extracantonment areas might be coordinated with the work of the military commanders of those areas, the Public Health Service appointed liaison officers to each of the nine Army Service Commands,<sup>6</sup> shortly after the national emergency had been proclaimed by the President. It was soon found to be desirable, in the interests of the total military effort, to coordinate the activities of these liaison officers with the work of other Government agencies, whenever possible. Consequently, a conference between Public Health Service liaison officers and officials of various Federal agencies was arranged for November 6 and 7, 1940, in Washington, D. C. At this meeting, health problems of common interest to the agencies represented were discussed.

Public Health Service liaison officers worked in close collaboration with State and local health agencies, which were the organizations actually providing health services in extramilitary areas. Each liaison officer also cooperated, specifically, with the Chief Surgeon of the Army Service Command to which he was assigned, the Director of the appropriate Public Health Service district, and the health officers of States within the command area. Duties of a liaison officer included: (1) determination of existing conditions which might menace the public health in his area; (2) anticipation of health hazards which might possibly arise as a result of concentration of large numbers of troops or war workers in communities in his area; (3) transmission to the proper military or civil authorities in the area of information regarding existing or potential health hazards; and (4) rendering of

<sup>5</sup> In fiscal year 1946, responsibility for the allocation of funds for construction, operation, and maintenance of rapid treatment centers was transferred from the Federal Works Agency to the Public Health Service. The 1946 appropriation for the establishment of rapid treatment centers—\$5,291,000—was made to the Venereal Disease Division of the Service, in addition to the Division's regular appropriation of \$11,949,000. The total figure of \$15,878,082 mentioned above as having been allocated for rapid treatment centers from 1944–46 includes the 1946 appropriation of \$5,291,000.

<sup>6</sup> Army Service Commands were then known as Corps Areas.

assistance to these authorities in their efforts to eliminate such hazards. Moreover, the liaison officer was expected to interpret requirements of military authorities in his area to District Directors of the Service and to State health officials.

## *Community Surveys*

### **Reconnaissance Surveys: 1939**

In 1940, when the emergency health and sanitation program was still in its infancy, the Surgeon General of the Public Health Service had described in vivid terms the responsibility facing health authorities in helping the Nation prepare for a global conflict. At a special meeting of the Association of State and Territorial Health Officers, convened in September of that year to discuss the impact of the national defense program on the public health, he said:

The most impelling problem that we face today is that of maintaining the safety of this country and its institutions. For their aggressive defense, we are gearing up governmental methods, mobilizing resources and manpower.

For the first time in all history, world events have thrust upon us the concept of total war. In preparing a total defense, all factors ultimately rest upon the one fundamental resource of the country—manpower. Medicine and public health through the centuries have been devoted to the conservation of manpower and its socially constructive use.

\* \* \* You have been called today to meet for the consideration of ways and means by which we may take the first steps through coordinated Federal and State action to conserve and utilize the vital resources of our country for national defense.

Of immediate concern \* \* \* are the sanitary and health emergencies created by the mobilization and military maneuvers of large bodies of troops in many States. The situation raises questions of military necessity—Federal versus State relationships and responsibilities—and even suggests the need to consider some plan for regionalized administration \* \* \*.

Even before this special meeting, however, the Public Health Service had begun to take the basic steps which were prerequisites for solution of what the Surgeon General had described as the “most impelling problem” facing health authorities throughout the country. These basic steps consisted, primarily, of “going out into the country” to see what the health situation was like in the most representative areas of the United States—the local communities. Shortly after the President had declared a state of limited emergency, the Service undertook a series of what were called “reconnaissance surveys” in localities where construction of military or industrial establishments was either contemplated or already under way as part of the Nation’s preparedness program.

The purpose of these surveys was threefold: First, to achieve a clear understanding of the nature and extent of the health problems which

would be thrust upon these communities when the national defense program swung into high gear; second, to evaluate the resources available locally for dealing with these problems; and, third, to determine what additional resources in the way of manpower, health organization, and physical facilities were required by these communities if they were to cope successfully with their imminent health problems.

Because of the rapid expansion of the war effort, serious problems of sanitation had already arisen in some areas prior to the initial surveys. Again, in some instances, surveys were made in communities where expected war developments failed to occur; while in others, subsequent developments far exceeded early expectations. Such mistakes were inevitable because, for quite valid reasons, neither the Federal agency responsible for guarding defense plant and other vital construction projects nor the military authorities could release information about new installations until contracts had been let; nor could they determine in advance the extent to which these installations might be developed. Notwithstanding the fact that errors were made, however, the community surveys conducted by the Public Health Service were of inestimable value in later planning of wartime health activities and in preventing, throughout the country, serious breakdowns in health and sanitation organization which might otherwise have occurred.

The 1939 reconnaissance surveys revealed, in many communities, a striking lack of certain physical facilities essential to good health and proper sanitation. Hospitals, health centers, and improved and extended water supply and sewer systems were particularly needed in the communities investigated. The data accumulated through the reconnaissance surveys furnished one of the most potent arguments for enactment of the Community Facilities Act, passed by Congress in 1941.

The surveys also emphasized sharply the need for an ambitious Nation-wide emergency health and sanitation plan if the United States were to remain healthy enough to carry out the national defense program successfully.

As the war effort grew more intense, as recruitment of troops and expansion of war industry began to take place at a more rapid rate, the need for emergency health activities to be undertaken on an extensive scale became even more imperative. As soon as funds and personnel became available to it for this purpose, the Public Health Service began to extend the coverage of its emergency health and sanitation program. Because of increasing shortages of health personnel throughout the Nation, it was possible for the Service to send emergency health and sanitation staffs only to those military and war industry zones—among the 1,500 to 2,000 in the continental United

States and its Territories—which were considered to require assistance most. Areas meriting immediate aid were determined on the basis of the preliminary reconnaissance surveys and confidential advance information received from the Army, Navy, War Production Board, and National Resources Planning Board on projected construction of military camps and war industry plants.

### **Reconnaissance Surveys: 1941–1944**

Having once made preliminary reconnaissance surveys of critical defense areas, the Service did not relax its attempts to gather information about health and sanitation problems facing communities of vital importance in the defense effort. Many such communities were resurveyed several times as the war continued—so that progress could be determined and further needs analyzed—and new areas were included in the surveys as they became essential to the successful prosecution of the war. Reports on community reconnaissance surveys conducted over the years 1941–44 were published periodically by the Service and a summary report on surveys conducted during these years was issued in January 1945. The summary report described studies of 476 extramilitary and war industry areas made in all 48 States and the Territories during this period. Included in this total were 166 military zones, 125 industrial zones, and 185 combined military and industrial zones. The report analyzed public health activities in each of these areas with regard to budgets, personnel on duty (including emergency health and sanitation personnel), and additional personnel required to carry on a minimum wartime public health program.

It revealed, in addition, that approximately 2,500,000 persons in 88 critical areas, comprising 121 counties, were without local public health services, while 31 areas, consisting of 38 counties inhabited by approximately 1,200,000 persons, were served only by unorganized public health agencies operating on a part-time basis. By 1944, 18 of the 476 areas were still appropriating less than 10 cents per capita per year for general preventive health activities, while in only 64 of them were sufficient sums being appropriated to meet the accepted standard of \$1 per capita per year.

### *Examples of Problem Areas Surveyed*

Some idea of the numerous facets of the emergency health and sanitation program can, perhaps, be presented most convincingly by a description of characteristic emergency health problems which had to be solved during the war period by Federal, State, and local health personnel in specific communities. The communities described below were all within critical war areas surveyed by the Public Health Service.

## Hampton Roads

Perhaps the most carefully guarded body of water in the United States during World War II was Hampton Roads, in Virginia. As the seat of the Western Hemisphere's largest and most completely equipped naval base—installations of which are spread throughout the cities of Norfolk, Newport News, and Portsmouth that border its spacious, well-protected harbor—Hampton Roads has been for many years an area of great strategic significance in the defense system of the United States.

Thus, it is easy to understand why the Public Health Service was particularly concerned during the war about health conditions in the cities and towns surrounding Hampton Roads. Heavy concentrations of population in this region made an epidemic outbreak of some communicable disease an ever-present threat. Both military personnel—attached to Army, Navy, and Coast Guard bases in the area—and war workers—engaged in constructing the water-borne sinews of war at Norfolk and Newport News shipbuilding yards—contributed in almost equal measure to the extreme congestion in the vicinity of the humming naval base.

Surveys of the Hampton Roads area conducted by the Public Health Service indicated that many improvements were needed in the communities surrounding the harbor if health standards were not to decline dangerously. Among those most urgently required were:

- (1) Adoption of new garbage ordinances and installation of adequate garbage collection and disposal systems in Norfolk and Princess Anne Counties.

- (2) Establishment of a mosquito control program in Newport News.

- (3) Adoption and enforcement of standard milk ordinances in Newport News and in Norfolk and Princess Anne Counties.

- (4) Adoption of a standard food ordinance and acquisition of an additional storage tank for filtered water and a 15-m. g. d. water pump in the city of Norfolk.

- (5) Elevation of the water level in Lake Kilby Dam and construction of three pumping stations and several storage reservoirs in order to provide additional water supplies for the city of Portsmouth.

- (6) Organization of a rodent control program in Portsmouth.

- (7) Appointment of additional sanitation personnel to enforce both existing and recommended milk and food ordinances in the region.

It was further recommended by the area survey team that, since 70 percent of the milk used by the three cities had to be obtained

from points too distant for inspection of the sources of supply to be conducted economically, some Federal agency should undertake to inspect and certify this portion of the region's milk supply.

### **Fort Leonard Wood**

The survey made of Fort Leonard Wood and its environs in Texas County, Mo., illustrates another type of wartime public health problem involving an important defense establishment. Migrations to the neighborhood of Fort Leonard Wood had already occurred on such a large scale by the time the survey was made that existing health facilities had become completely inadequate. Largely rural, the area lacked many modern health and sanitary facilities, and its health standards had been low even before the shift in population had taken place.

There were only a few towns in the vicinity of the fort—Waynesville (1940 population, 468), Rolla (1940 population, 5,141), and Newburg (1940 population, 1,056). Obviously, none of them was able to care for the recreational and entertainment needs of the thousands of soldiers and civilians brought into the area by the defense program. Under such circumstances, the health level of the area was maintained throughout the war only through extraordinarily strict control measures.

### **Seneca, Ill.**

The war industry area in the vicinity of Seneca, Ill.—a town which had been only a small trading village before 1939—was another example of a typical wartime “problem area” from the standpoint of health. Seneca blossomed into a tremendous shipbuilding center during the war, becoming known as the “Prairie Shipyard.” Built at a point on the Illinois River deep enough to float ocean-going LST barges and easily and quickly accessible by rail from Chicago (where some of the primary construction work on LST's was performed), Seneca was particularly well situated to play a key role in the fabrication of assault craft. There were also other important war industries established in the vicinity of the town. A dynamite manufacturing plant, for example, was situated only 2 miles east of Seneca, on the south side of the Illinois River.

Seneca, in 1940, had a population of 1,235. From about May 1942, when the shipyards were first erected there, to the end of 1943 the town's population grew to approximately 6,200; by 1944, it had reached 14,000, or more than 10 times the 1940 figures. But health and medical care facilities in the Seneca area did not, unfortunately, increase initially in proportion to the town's industrial growth.

As a result of the reconnaissance survey of the Seneca region made by the Public Health Service, a health center, operated by Service

personnel, was opened in the town's wartime housing development. The center's staff included a registered nurse and three nurses' aides. The community nurse—employed by the county health department—and local physicians cooperated in the work of the center by attempting to see that its services were furnished to the town's inhabitants on an equitable basis. Assisted by the nurse, the doctors screened patients applying to the center for treatment so that those most in need of care would receive immediate attention.

Seneca's municipally owned waterworks system consisted of one 700-foot well, a small elevated storage tank, and distribution mains which served only a portion of the town. To meet the increased water requirements of the town's inflated population, the Federal Works Agency undertook a project which involved drilling of a second 700-foot well, extension of the town's water mains so that they would serve newly constructed housing developments, and provision of storage capacity for an additional 200,000 gallons of water.

### **Camp Gruber**

The defense area around Muskogee, Okla., including the military establishment at Camp Gruber, the Muskogee Municipal Airport, and the Oklahoma Ordnance Works, represented another critical zone which grew so rapidly in population during the war period that its available health facilities were inadequate to meet the numerous demands made upon them.

Originally a sparsely populated area, with Muskogee the only town in the vicinity having a population of over 25,000, the defense region around Camp Gruber was suddenly faced with the necessity of providing health and recreational facilities for a military population of approximately 35,000 stationed in the armored force training center established at the camp.

In the rural sections of the area, outside of Muskogee itself and the few small towns in its vicinity, Public Health Service surveys revealed an ominous lack of basic health and sanitation facilities. The Service and the Federal Works Agency, however, managed, through joint action, to correct the most serious deficiencies in sufficient time to prevent a marked deterioration in the area's health status.

### *Orientation and Training*

All surveys made of extracantonment and other defense areas indicated that the most immediate need in almost every case was for additional health personnel. Without competent personnel to organize and direct construction, there was little likelihood that proper health and sanitation facilities could be provided in communities which lacked them. To meet this need, the Public Health Service organized special orientation courses for its new personnel (both com-

missioned and civil service). These courses were of particular importance for new personnel slated for field work, since the job they had to do in local communities required that they receive special training.

Sixteen orientation courses were conducted during the war period under Service auspices. They were held at the National Institutes of Health, in Bethesda, Md., and were designed to familiarize newly appointed Service personnel with the policies and standards of conduct of the Public Health Service with respect to cooperation with Federal, State, local, and voluntary health agencies in furthering the aims of the national defense program.<sup>7</sup>

The orientation program was organized following a conference, early in 1941, between the deans of several schools of public health and representatives of the Service. At this conference, the school authorities recommended that the Public Health Service assume responsibility for establishing an orientation course for new employees, agreeing to assist the project in an advisory capacity.

As a result of this recommendation, an administrative staff of three persons—a medical officer, a sanitary engineer, and a public health nurse—was selected from among Service personnel to conduct the orientation program. The advisory council, appointed by the Surgeon General, was composed of eight members, each of whom was a member of a university public health faculty.<sup>8</sup> State and local health officers also assisted the Service in running the orientation program, which was officially launched at Service headquarters in Washington, D. C., in April 1941.

The course consisted of 4 weeks of lectures, conferences, and discussions on various phases of public health and its administration. Initially, it also included a 2-week field assignment, carried on in a demonstration defense area near Baltimore, Md. As the program progressed, however, it was accelerated by the introduction of sample field problems into the 4-week course to replace the special field training period. At the termination of the course, personnel who had taken it were sent to fill vacancies in or augment the staffs of State and local health departments in order to help eliminate health hazards in critical defense areas.

Through conducting these orientation courses, the Public Health Service gained the basic experience necessary for successfully or-

---

<sup>7</sup> The program of lectures and seminars for the sixteenth Public Health Service orientation course, given in 1944, is included as appendix E.

<sup>8</sup> The following institutions were represented on the advisory council: School of Public Health, University of North Carolina; School of Public Health, Columbia University College of Physicians and Surgeons; School of Public Health, University of Michigan; Department of Preventive Medicine and Public Health, Vanderbilt University School of Medicine; School of Public Health, University of Minnesota Medical School; School of Public Health, Harvard University; School of Hygiene and Public Health, Johns Hopkins University; Yale University School of Medicine.

ganizing, at a later date, its training program for public health workers at Atlantic, Ga.

### *Assignment of Personnel*

During the period of operation of the emergency health and sanitation program, about 1,000 professional public health workers were assigned by the Public Health Service to various jobs in critical areas where the need for them was most urgent.

The duties they performed were of widely varying kinds. In some communities, Service physicians were employed as local health officers. In this capacity, they conducted clinics and carried out other appropriate medical functions. In other cases, medical officers of the Service were assigned to specific localities to solve special health problems which were too great for health authorities on the spot to handle.

Nurses, recruited by the Office of Public Health Nursing in the States Relations Division, assumed routine public health nursing duties in many defense areas. They worked largely with community medical service programs, industrial plants, health units, small infirmaries in war housing developments, and other similar projects. In many instances, they also gave bedside nursing care, when necessary, to the general public in these areas. Most of them came to the Public Health Service from large nonofficial public health nursing agencies.

Engineers, sanitarians, bacteriologists, veterinarians, and other health specialists of the Service also assisted State and local health departments in conducting emergency health and sanitation activities in defense areas. Frequently, too, they helped State health departments carry out special assignments given them by various Federal agencies in connection with the war effort.

Although they were Federal employees, emergency health personnel were primarily responsible to the State and local health units to which they were assigned. The status of such personnel was clearly defined in the following statement made by the Chief of the States Relations Division to the Conference of State and Territorial Health Officers on April 29, 1941:

These people will be assigned to critical localities, they will be subject to your direction, and they will be responsible to you and to the local health officers. So far as your relationship with these persons is concerned, the scheme will be no different whatever from the procedure you are now following under title VI of the Social Security Act, except that they will be paid directly by Government check. There are two qualifications which I want to make. Such persons must be assigned to defense areas and be prepared to accept changes of station. In other words, you may have these people taken away from you and assigned to another place where the emergency is greater. We hope that that will not be necessary, but it might happen.

I hope you will not get the implication that the Public Health Service is taking over the job. We are neither accepting the full fiscal responsibility nor the administrative responsibility for the medical and health aspects of national defense. We expect to go forward with you on the same cooperative basis that has been followed for these several years, especially since the enactment of the Social Security Act. We want the partnership to be of the same character. We expect to make recommendations to you and you must feel free to make recommendations to us.

Although assignment to vital defense areas of emergency health and sanitation personnel recruited by the Public Health Service could not eliminate entirely the wartime health problems of the United States, it did much to alleviate the most dangerous emergency situations.<sup>9</sup>

### *Role of District Offices*

Actual assignment to critical defense areas of personnel recruited and trained for emergency health duties during the war years was largely in the hands of the district offices of the Public Health Service. Assignments were made by District Directors of the Service through State and local health departments, under the general supervision of officials from Service headquarters in Washington, D. C.

District personnel worked intensively with State and local health officials to set up programs and assign personnel in such a manner as to meet the most urgent needs of local communities without permitting existing standards of health to be lowered anywhere. With the aid of funds from appropriations for emergency health and sanitation work, district offices assisted in solving local emergency health problems by making limited reconnaissance surveys and by giving advice to health officials in critical areas on such subjects as administration of nursing services, industrial hygiene programs, milk, food, and general sanitation ordinances, tuberculosis control activities, and laboratory services; construction of community health facilities; disaster control measures; procurement and assignment of personnel; and establishment of programs of emergency medical care in preparation for possible enemy air attacks.

District Office personnel of the Service were also called upon for advice by the Federal Works Agency, War Production Board, War Food Administration, Army and Navy, Maritime Commission, Coast Guard, and Federal Public Housing Authority; the National Park Service, Bureau of Indian Affairs, and Bureau of Reclamation of the

---

<sup>9</sup> Tables in appendix C analyze each type of emergency health and sanitation personnel with regard to number of assignments undertaken and number of months served on such assignments. Types of employees covered are physicians, dentists, engineers, nurses, sanitarians, health education consultants, bacteriologists, laboratory and medical technicians, milk specialists, and chemists.

Interior Department; the Bureau of Entomology and Plant Quarantine of the Department of Agriculture; the Bureau of Prisons of the Department of Justice, and other Government agencies.

During floods and other disasters which occurred in the course of the war, Public Health Service district headquarters sent engineer officers to the scene of the catastrophe to help set up special sanitation programs.

## Specific Phases of the Program

### *Malaria Control and Related Activities*

In May 1940 as the military situation on Europe's Western Front became increasingly grave and as the possibility became imminent that the global conflict might soon be extended to some of the world's most notorious malarial regions, authorities in the field of malariology from all over the United States held a meeting at Emory University, in Atlanta, Ga. Among those present at the meeting were the Surgeon General of the Public Health Service and representatives of the American Medical Association, the American Society of Parasitologists, the American Society of Tropical Medicine, and the National Malaria Committee.

The scientists assembled at this meeting were all aware that malaria could become a major obstacle to the successful prosecution of a global war. They realized that the disease would present a definite threat to the health and efficiency of troops and war workers who might have to be quartered in sections of the American South where malaria was endemic, as well as to the combat strength of units of the armed forces which might find it necessary to fight in malarious regions in other parts of the world.

Later in the year, a "Symposium on Human Malaria" was held in Philadelphia under the auspices of the American Association for the Advancement of Science. The proceedings of this meeting, which were published in book form, became an important source of information for the antimalaria campaign during the early months of American participation in the war; the material contained in these proceedings helped during this period to stimulate antimalarial research and to improve the quality of mosquito control measures undertaken.

During 1942, with the further intensification of the American war effort following Pearl Harbor, the Nation's malaria experts began to take more vigorous action to combat the menace of this disease. Public Health Service personnel were in the forefront of these activities.

#### **Office of Malaria Control**

Since malaria was known to be an actual or potential health hazard in at least 150 critical military and war industry areas throughout the United States, the Public Health Service decided, shortly after

Pearl Harbor, to establish a special field headquarters to direct the campaign against it. Consequently, in February 1942, the Office of Malaria Control in War Areas was set up by the Service in Atlanta, Ga.

Malaria control measures undertaken by the Office were, in the main, carried out in areas outside of military reservations; however, such measures were coordinated with similar control work performed by military authorities within the reservations.

Although the Office of Malaria Control in War Areas was given authority to deal directly with the States in organizing programs of malaria eradication, it was required to keep appropriate district offices of the Public Health Service informed of all pertinent details regarding its activities. In many instances, district office personnel were called upon by the Office of Malaria Control to help in solving problems of Federal-State relations which arose in connection with its campaign against malaria.

One of the major tasks of the Office of Malaria Control in War Areas was to aid the States in organizing their own malaria control programs. In pursuit of this objective, the Office furnished assistance to State health departments in the form of: (1) trained personnel; (2) specialized equipment; (3) materials difficult to obtain because of war priorities; (4) technical consultation; and (5) advice on administrative and fiscal matters.

In addition to offering these services to the States, the Office of Malaria Control developed and operated malaria control projects in war industry and extracantonment areas which needed antimalaria protection and launched an educational program to inform the general public of the important role the latter could play in malaria control.

Malaria control programs within the States consisted, in general, of eradication of the breeding places of *Anopheles* mosquitoes, supplemented by destruction of adult mosquitoes in homes by means of insecticides. A director of malaria control activities was responsible for over-all supervision of control work within a particular State. The Office of Malaria Control in War Areas assigned an entomologist and an engineer to most of the Public Health Service district offices to give technical advice and guidance to staffs administering individual State control programs.

In carrying out its antimalaria program, the Office of Malaria Control in War Areas often worked in cooperation with other Public Health Service divisions whose official responsibilities brought them into contact with the Office and its program. Among these were: the Foreign Quarantine Division, Division of Public Health Methods, Sanitary Engineering Division, Division of Commissioned Officers, and the National Institute of Health.

Although it concentrated mainly on the antimalaria campaign, the Office of Malaria Control also undertook other projects from time to time during the war. A dengue fever control program was organized in Hawaii, for example, and a demonstration project on eradication of the *Aedes aegypti* mosquito was conducted at Key West, Fla., at the request of the Navy Department.<sup>10</sup> In cooperation with the Bureau of Entomology and Plant Quarantine of the Department of Agriculture, the Office of Malaria Control carried out a plan for controlling dog flies in the vicinity of Army Air Force training stations located along the northwestern Gulf Coast of Florida. These vicious insects, whose bites were often a serious hindrance to Air Force training schedules, were prevented from breeding, initially, by treatment of beach deposits of marine grasses, in which they usually clustered, with diluted creosote sprays; subsequently, DDT sprays were used for this purpose.

The first antimalaria projects established under supervision of the Office of Malaria Control were set up in Florida. Organization of these projects usually followed Army communications requesting that State authorities undertake malaria control programs in the neighborhood of particular Army training camps. After making a rapid survey of an area, State officials would submit to the Office of Malaria Control a project proposal for complying with the Army's request. The Office then checked the area for density of malaria vectors, and, if it approved the proposal in question, appointed an area supervisor, trained in Washington or Atlanta and assigned to the given area by the State government. The area supervisor hired, through the United States Civil Service Commission and the United States Employment Service, a staff of inspectors, foremen, and laborers. A map of the area concerned was then obtained or made, and control activities were begun. The State entomologist usually assisted the Office team in setting up control stations and locating mosquito-breeding spots. This general pattern was followed as the Office of Malaria Control in War Areas extended its operations beyond the boundaries of Florida, under the stimulus of an intensification of the war.

To improve its malaria control techniques, a study was undertaken by the Office to determine incidence of malaria in the United States, local foci of the disease, and factors contributing to its perpetuation. One hundred and twenty representative counties throughout the Nation were chosen for this investigation—those counties officially recorded as having the highest malaria death rates in the country per 100,000 population and per 1,000-square mile area. In the course of this 120-county survey, personnel of the Office made analyses of malaria mortality and morbidity statistics, studies of the spleens of

<sup>10</sup> These programs are described on pp. 34-36.



A good breeding place for *Anopheles* mosquitoes. Elimination of such places was one of the main jobs of the Office of Malaria Control during the war.



Here, water samples are being collected from a swamp so that organisms which serve as food for mosquito larvae may be studied. Alkalinity or acidity of the water is being determined at right.

school children, parasitemia investigations, and evaluations of the effects on malaria incidence of local physiography and such socio-economic factors as community standards of housing and education.

Some idea of the widespread efforts carried out by the Office of Malaria Control to reduce malaria incidence in the United States during the war by means of various methods of mosquito control can be gained from the following statistics:

(1) 294,953 pounds of DDT were used for residual spraying of 649,069 houses during the period 1943-46.

(2) Larvicides used during the same period totaled 5,693,858 gallons of oil and 729,710 pounds of paris green.

(3) Drainage operations covered 10,898,484 linear feet of ground during those years; in addition, 13,503 acres of water surface were eliminated and 315,738 cubic feet of filling was accomplished.

During the most intensive phase of the American war effort, in fiscal year 1944, the Office of Malaria Control protected approximately 1,800 war establishments in 250 vital areas from the scourge of malaria. Personnel engaged in antimalaria activities numbered 3,213 during that year. Of this number, 260 were in the professional grades and 415 in the subprofessional, while 138 were clerical personnel and 2,400 were custodial employees and laborers.

As a result of the coordinated efforts of the medical, entomological, and engineering personnel of the Office, no serious outbreak of malaria occurred during the war years in important military training or war industry areas, despite the fact that persons from nonmalarious regions of the country migrated in large numbers to sections of the South where malaria had always been endemic.

During fiscal years 1942-1945, the Office expended a total of \$23,305,936 in emergency health and sanitation funds for its operations to control mosquito-borne diseases.<sup>11</sup>

### Larviciding Operations

The basic antimalaria operation carried out by the Office of Malaria Control in War Areas was application of various larvicides to breeding places of *Anopheles* mosquitoes.

Larviciding activities undertaken by the Office varied in intensiveness with the climatic characteristics of the regions involved. In southern Florida, southern Louisiana, and Puerto Rico, larvicide applications were made throughout the year. In more northerly areas, the larviciding season was reduced, being limited to 2 months in some marginal States.

---

<sup>11</sup> Other data on operations of the Office of Malaria Control can be found in appendix D.



Killing the mosquito or its larvae is the fundamental step in preventive malaria control. Here a man sprays a stagnant pool with poison dust.



During the second stage of the malaria mosquito's life cycle, larvae must have access to the surface of the water to obtain food and air. Covering the water with a thin coating of oil is effective in killing the larvae.

Paris green was the most extensively used larviciding agent. Although oiling was considered to be a preferable technique for eliminating mosquito breeding, paris green was used wherever oiling was, for one reason or another, either impractical, ineffective, or unduly expensive. Several methods were used for applying paris green to breeding areas. For covering large areas, dusting from the air as well as power dusting from the ground was employed; in areas which were more easily accessible to men on foot, hand dusting was the usual means employed. Of the 187,799 acres treated with paris green during 1944, 45 percent were dusted by hand, 34 percent by airplane, and 21 percent by power duster. Cost of these three methods per acre treated were, respectively, \$2.98, \$1.06, and \$0.65.

In many sections of the country, oil was the only larvicide used. Applications of oil were made to 80,705 acres in 1944. Oil larviciding was carried on largely by hand, the amount of oil used varying from 12 to 50 gallons per acre. Approximately 3,000 sprayers—of both the knapsack and compressed air type—were used during the year for oil larviciding activities. In order to conserve badly needed personnel, powered equipment was used whenever possible to oil water surfaces covered by heavy "floatage" or dense vegetation. Application of oil by powered machinery was much less expensive than application by hand; the average expenditure per acre for labor, larvicide, and equipment when oiling was done by power units was only \$2.26, whereas it came to \$9.55 when hand equipment was used. Nevertheless, it was frequently necessary to use hand equipment in larviciding, since certain mosquito breeding areas were inaccessible to powered machinery.

Areas which were favored by malaria mosquitoes as breeding places, such as the irrigated rice fields of Arkansas, Louisiana, and coastal Texas, could be dealt with most effectively, it was discovered, by the application of paris green. It was thought at first, however, that paris green might damage the rice itself. Consequently, an experimental project at Stuttgart, Ark., was organized jointly by the Office of Malaria Control and the Rice Branch Experimental Station of the University of Arkansas for the purpose of analyzing effects of paris green on rice plants. After a 2-acre section of rice field had been dusted weekly for several weeks during the growing season, the conclusion was reached that paris green mixtures used as larvicides did not affect rice yields unfavorably. Airplane dusting with paris green was adopted, therefore, as the characteristic method of eliminating mosquito-breeding places in very heavily infested areas.

### Drainage Operations

Drainage is usually considered to be the most permanent method of malaria control; because of its costliness and the existing manpower



Strafing tactics were often used by the Office of Malaria Control in the fight against malaria. This plane is spraying poison dust over a swamp area to prevent malaria mosquitoes from breeding.



A mobile mosquito control unit conducting larviciding operations.



Well constructed drainage ditches can be useful in an effective antimalaria program. Many ditches such as the one pictured here were built by the Office of Malaria Control in the course of its wartime operations.



A major ditch is shown being dug by the dragline method.

shortage, however, drainage had to be used on a selective basis in the emergency antimalaria campaign. During the winter of fiscal year 1944, as many as 63 major drainage projects were in operation in 46 areas in 13 States and Puerto Rico. Since malaria-carrying mosquitoes in the continental United States seldom fly more than a mile from their breeding grounds, drainage projects were usually concentrated within a 1-mile radius of population centers. In the West Indies, where the malaria vector, *Anopheles albimanus*, has a longer flight range and more varied breeding habits than its cognate species in the United States, drainage operations were frequently extended 2 miles from inhabited areas.

Approximately 1,139 miles of ditching was constructed in the course of 1944 drainage operations conducted by the Office of Malaria Control; of this total, 1,059 miles was cut by hand, 60 prepared by dynamite, and 20 by dragline. In addition, 26,804 feet of subsurface drain was constructed and 60,000 linear feet of permanent ditch lining was installed during the same year, while ditches totaling about 1,300 miles were cleaned.

### Other Antimalaria Activities

In addition to larviciding and draining mosquito-breeding places, the Office of Malaria Control in War Areas used various other means of eliminating malaria-carrying mosquitoes, depending upon local conditions.

For permanent elimination of certain breeding areas, more than 300,000 cubic feet of earth fill was employed by the Office. Filling operations were carried out by various methods.

To afford access on foot to certain breeding areas and to permit uniform application of larvicides to them, heavy vegetation was removed from about 8,000 acres of land in regions where mosquito control measures were being undertaken. Large scale clearing activities were initiated in the neighborhood of Washington, D. C., to rid the Potomac River of the malaria hazard represented by its undergrowth of water chestnut plants. Destruction of these plants was actually carried out by the U. S. Army Engineer Corps, but was partially financed by the Office of Malaria Control.

Spray killing of adult mosquitoes in and around dwelling units was found to be another effective method of malaria control under certain conditions. This method was first tested on buildings in the vicinity of Stuttgart, Ark.—situated in a large rice-growing area—where a pilot school for training personnel to use spray killing as a technique for mosquito elimination was established. Nineteen farm establishments, consisting of 119 buildings, were used by the school for demonstration purposes. Each of these buildings was sprayed twice a week.



A large malaria control ditch built in Puerto Rico during the war by hand labor.



Since the malaria mosquito needs standing water in order to hatch its young, one means employed by the Office of Malaria Control for preventing this mosquito from breeding was to fill ponds such as this with dirt.

Interior spraying was done with either hand-operated or pressure sprayers, while a power sprayer mounted on a half-ton truck was used for outside spraying. Spraying operations of this type were found to cost, on the average, about the same as larviciding on a comparable scale.

### **Extended Control Plan**

The program of the Office of Malaria Control in War Areas was expanded, late in 1944, to include control activities in the vicinity of military hospitals and camps for war prisoners. In many of these institutions, there were large concentrations of men suffering from malaria.

A proposal to extend the existing malaria-control program had been discussed, initially, before a meeting of the Association of State and Territorial Health Officers held in New York on October 6, 1944. The Association had endorsed the proposal by formal resolution, and had recommended that the Surgeon General of the Public Health Service place it before Congress. Military authorities had also supported the proposal. Accordingly, the Service had formally presented the proposed program to the Bureau of the Budget in October 1944 with the request that a special appropriation be granted to effectuate it. The Budget Bureau had approved the request, and an appropriation providing for extension of the malaria-control program was authorized December 22, 1944.

The extended program shifted the main focus of malaria control from protection of extracantonment and war industry areas to protection of the general public against malaria-carrying soldiers returning from overseas. Under this program, 300,000 houses in certain malarious areas in 13 Southern States were sprayed with DDT. State health departments which undertook spraying operations were provided by the Office of Malaria Control with men, materials, and technical supervision as well as with consultant services to help them organize antimalaria education campaigns among the public. Educational materials used in these campaigns consisted of lectures, motion pictures, film slides, and radio programs.

The development of DDT made it economically practicable, for the first time, to carry malaria control to individual homes, regardless of the occupants' financial status. DDT was particularly useful for control activities in endemic malaria areas which were predominantly rural and in which no military camps or defense plants were located; areas of this kind did not normally come within the scope of other control programs of the Office of Malaria Control in War Areas. Used as a residual spray in houses, DDT became the spearhead of a widespread campaign directed specifically against potentially infected



A DDT crew tests its equipment before starting to spray a house. Each man is equipped with a portable sprayer containing a solution of DDT.



A thorough DDT spray job requires that special attention be given to corners where walls and ceiling meet.

mosquitoes in rural areas. In addition to its other advantages as a control method, DDT residual spraying was a less costly procedure than larviciding.

Residual spraying of houses with DDT killed those potentially infective *Anopheles* mosquitoes which had ingested or might soon ingest human blood. By concentrating combined residual spray and larvicide treatments in malarious zones and by holding mobile control units prepared for immediate action in case an outbreak of malaria should occur, the Office of Malaria Control helped, by its extended control program, to reduce substantially the public health hazard represented by returning military personnel who might be harboring the disease.

In the southeastern section of the United States, where malaria is endemic, control activities were extended through the use of existing facilities. Eight mobile malaria control and inspection units were established in appropriate district offices of the Public Health Service. The officer in charge of each mobile unit supervised inspection and control procedures, which were actually carried out by a small crew of from two to five men. Each unit included a passenger vehicle and a 1½-ton truck equipped for inspection, larviciding, DDT spraying, and incidental drainage work.

### **In-Service Training**

Since manpower was in even shorter supply than materials during most of the war period, the Office of Malaria Control in War Areas was forced to begin operating with only a small nucleus of trained men.

As the responsibilities of the Office expanded, its requirements for physicians, entomologists, and engineers increased. Because the number of fully trained men who were available in these professions was rapidly diminishing, an orientation and training program was established by the Office staff. A minimum number of well trained professional officers was vital to the antimalaria program, since they, in turn, had to be responsible for schooling subprofessional employees, inspectors, and foremen to perform individual control operations.

Lectures given during the in-service training courses conducted by the Office were supplemented by educational film strips, laboratory work, and directed reading, in addition to a period of supervised field work in a training area near Atlanta. Moreover, trainees were given an opportunity to study full-scale malaria control programs in actual operation.

### **Antimalaria Education**

In the course of carrying out its antimalaria operations, the Office of Malaria Control found that a definite relationship existed between

incidence of mosquito-borne diseases and the amount of education on control measures received by the public. This relationship was an almost directly inverse one—the more knowledge possessed by the public on methods of controlling a specific disease, the lower, in general, was the incidence of that disease.

The directors of the Office concluded that if they wished the public to participate in malaria control measures, they must make certain that correct information on such measures was disseminated as widely as possible. They realized that general understanding by the public of the menace of malaria and of the means of controlling it could be an important factor in reducing its incidence in the United States. Consequently, the Office organized a program of antimalaria education with the following objectives:

1. To present the known facts about mosquito-borne diseases clearly;
2. To outline, specifically, what individuals and communities might do to prevent or control mosquito-borne diseases;
3. To stimulate individuals and communities to assume responsibility for acting to prevent or control these diseases.

Educational materials were presented to the public by various means. In a number of schools, classes on mosquito-borne diseases were taught, and each student was charged with inspecting his own home and eliminating any mosquito vectors discovered. Public lectures were given by staff members of the Office of Malaria Control to acquaint professional and civic groups with the purposes of the campaign against disease-carrying mosquitoes. During the dengue fever epidemic in Hawaii, school children in the Territory were given sufficient instruction in control methods to enable them to play an important role in combating the epidemic.

Through this education program, the Office was able to carry on effective mosquito control work even in areas where costs of manpower, materials, and equipment were so high as to make more direct control methods impossible to undertake.

### **Control of Dengue Fever: Hawaii**

Control of dengue fever in the Hawaiian Islands was another war-time activity of the Office of Malaria Control in War Areas.

This disease, which was presumably introduced into Hawaii by air travelers from the South Pacific, reached epidemic proportions in the islands during 1943, when morbidity ran as high as 159 cases a week. The Territorial Board of Health and the Army Medical Department took immediate action to control mosquito vectors of the disease, since vital military operations were then being staged from Hawaiian bases. As dengue incidence continued to increase, despite control measures undertaken on the spot, assistance was requested of the Public Health



Proper screening of a porch requires reinforcement. The carpenter is shown tacking an extra strip over the edge of the screen to make sure no crevices will remain through which mosquitoes may enter the house.

Service. In response to this request, the officer in charge of the *Aedes Aegypti* Section of the Office of Malaria Control in War Areas and the supervisor of the *Aedes Aegypti* Control Unit in Savannah, Ga., were immediately sent to Honolulu to set up a dengue control program.

Immediately upon arrival, they recruited inspection and control crews to investigate dengue-infested areas in Honolulu and elsewhere on Oahu Island, as well as on the nearby islands of Hawaii, Maui, and Kauai. When areas of infestation had been determined, control measures were applied. Sprays were employed to destroy mosquito vectors of the disease and environmental sanitation principles stringently applied as a means of reducing the mosquito population in the islands. Health education programs were initiated for civilians which sought to impress on them the necessity for eliminating mosquito breeding places and for reporting promptly all dengue fever cases.

Application of these methods of control resulted in a gradual diminution of dengue incidence, and the disease was subsequently eliminated from Hawaii. The danger of reintroduction of dengue fever into the islands remained present, however, throughout the remainder

of the war years because soldiers infected with the disease were being continuously returned to Hawaii from the South Pacific.

### Combating the *Aedes Mosquito*

The wartime *Aedes aegypti* control program, for which a special allocation was made from emergency health and sanitation appropriations, was also administered by the Office of Malaria Control.

At the outset of the war, the *Aedes aegypti* mosquito, a potential carrier of yellow fever and dengue, was prevalent in most southern cities and ports of entry from Brownsville, Tex., to Charleston, S. C. Planes flying from West Africa and South America—both endemic yellow fever areas—were landing in the United States quite frequently. Consequently, the possibility that these diseases might be introduced into the country by means of airplane passengers and accidentally imported mosquitoes was great.

Yellow fever, which had been epidemic in some sections of the United States in the past, might have crippled the Nation's war effort if it had broken out again. A dengue epidemic, likewise, could well have immobilized an industrial city for a period of 2 months or longer. Thus, control of *Aedes aegypti* mosquito breeding, especially at military points of entry and in regions where war workers were concentrated, was given high priority during the war period by the men in charge of the Malaria Control Office.

Danger was particularly acute in certain areas along the Atlantic Coast and the Gulf of Mexico. Therefore, trained crews, armed with essential equipment and supplies, were picked to institute control measures in selected areas of South Carolina, Georgia, Florida, Louisiana, and Texas. Since effective curtailment of *Aedes aegypti* breeding was essential to the success of the control program, control teams concentrated on destroying *Aedes* larvae, which were often found in artificial containers and elsewhere in and around habitations, and on teaching people in the selected areas to eliminate or remove receptacles or other household articles which could serve as breeding places for mosquitoes.

Control projects undertaken in these selected war areas were successful in substantially reducing the prevalence of *Aedes aegypti* mosquitoes.

### Research on Mosquito-Borne Diseases

In addition to carrying out malaria, dengue fever, and yellow fever control activities, the Office of Malaria Control made studies of the role mosquitoes play in transmission of certain other diseases.

For example, varieties of the common pest mosquito were found, as a result of one of these studies, to be potential carriers of encephala-



The Office of Malaria Control also carried on an active campaign during the war against the *Aedes aegypti*, or yellow fever, mosquito. Clogged roof gutters, which sometimes offer breeding places for the species, were cleared in this campaign.

litis and filariasis. A medical officer was subsequently assigned by the Office to follow further developments in the analysis of filariasis causation and to disseminate both popular and technical information on the disease.

### *Plague Control in Hawaii*

An outbreak of bubonic plague which occurred in the Hawaiian Islands in 1945 threatened to assume serious proportions. A plague epidemic in Hawaii would have constituted not only a local health problem but also a grave threat to the military efficiency of the large number of troops either stationed in or passing through the islands. The greatest menace, from the military point of view, lay in the possibility that the ports of Hilo and Kahului might become infected. Both of these towns were important transshipment points for military personnel being sent to the battle fronts in the Pacific.

In cooperation with the Hawaiian Territorial Board of Health, the Public Health Service undertook a plague control program in Hawaii after sporadic cases of plague in human beings had occurred in the

Hamakua District of the Territory. Public Health Service personnel in Hawaii were increased, so that the three principal aims of the plague control program in the islands might be more easily accomplished.

These three aims were: (1) protection of inhabitants of villages and military camps in plague areas from diseased rodents; (2) eradication of the disease in these areas by an intensive and sustained rodent suppression campaign; (3) maintenance of existing boundaries of plague areas by means of continuous examination of rodent samples from immediately beyond these boundaries for evidence of infection.

Rodent suppressive measures conducted in local communities included baiting, trapping, and ratproofing. Sanitary inspection of all premises in plague areas was carried out in order to eliminate conditions which might foster rodent infestation, and all rodents recovered from individual homes were submitted to a plague control laboratory for examination.

Customary surveillance of the port of Hilo for signs of plague and routine inspection for rodents of railroad cars, piers, ships, and incoming cargo were intensified. Rodent suppressive activities in Hilo included periodic poisoning and daily trapping at the piers as well as trapping at regular intervals in the town itself.

As a result of these control measures undertaken by Service personnel with the cooperation of Territorial health authorities, the danger of a possible epidemic of bubonic plague in Hawaii was averted.

### *Typhus Fever Control*

Typhus fever, a rat-borne disease endemic in the American South, was recognized, early in the war, as a possible threat to the health of southern industrial workers and of military personnel being trained in the Southern States. It was expected that incidence of this disease would increase as a result of dislocations of population and overcrowded living conditions imposed, in many sections of the country, by the requirements of the national defense program.

Under these circumstances, the Public Health Service began to guard against the threat of a typhus outbreak during 1942. Control measures, aimed at reducing rat infestation in buildings where large numbers of people congregated, included: (1) ratproofing of the buildings; (2) extermination of rats by poisoning and fumigation; (3) use of DDT to kill typhus fleas;<sup>12</sup> (4) protection of stored food from rats; (5) proper collection and disposal of garbage.

A staff of Service field personnel, including physicians, engineers, and trained sanitarians, was assigned to municipalities in the endemic

<sup>12</sup> Dating from July 1945.

area upon request. They organized typhus control programs and, at the same time, trained local health department staffs in all phases of typhus control work. As soon as local health officials were prepared to continue and maintain a typhus control project in a particular community, the Service transferred its personnel to another area.

Most of the equipment needed for typhus control in small municipalities, and part of that required to initiate control activities in larger ones, was supplied by the Public Health Service. Property owners, however, were required to pay costs of labor and materials used to ratproof their buildings.

A Typhus Control Office was maintained in Atlanta, Ga. Here, administrative and fiscal matters connected with the control program were handled and a small laboratory was operated for the identification of parasites collected from rats in communities where control measures were being carried out.

The typhus control unit of the Service received numerous requests from both the Army and Navy for assistance in controlling rats in military cantonments in the South. In response to these requests, trained personnel were sent by the Service to make surveys and outline control programs.

### *Industrial Hygiene Activities*

Since it was essential that maximum industrial production be maintained throughout the period of America's war effort, preservation of the general health of industrial workers the country over was a problem which began to receive greater attention from health officials even before the United States began to take an active part in the conflict.

Not only were existing industrial hazards unusually intensified in defense production, but additional sources of danger to workers were created by the use of new processes and materials. As production quotas were stepped up to meet the needs of the defense program, fatigue often resulted among employees, leading to numerous accidents. Many of the more physically fit industrial workers joined the armed forces, thus increasing the proportion of those needing special health attention among employees who remained on the job. An estimate, made early in the war, indicated that more than 40 million working days were lost each month because of sickness and disability among industrial workers.

Soon after the President's proclamation of a national emergency, the Public Health Service conducted an inspection of industrial hygiene activities in 36 States in order to obtain first-hand information on problems confronting newly created war industries. Later, when special emergency health and sanitation funds were appropriated,

the Service assigned physicians, engineers, and chemists, paid from these funds, to help State and local industrial hygiene units meet their increased responsibilities. State industrial hygiene laboratories also received loans of essential equipment which they would not have been able to procure otherwise.

Emergency industrial hygiene activities already being carried on by the Public Health Service through the States Relations Division were closely coordinated, after July 1941, with those being undertaken by the Division of Industrial Hygiene of the Service's National Institute of Health.

The two Divisions performed the following industrial hygiene services in connection with the defense program: (1) training of industrial hygiene personnel; (2) provision of direct service to Federal industrial establishments such as arsenals and Navy yards; (3) field and laboratory investigations of hazardous industrial processes; (4) furnishing of technical assistance to State industrial hygiene units engaged in studying and controlling industrial hazards; (5) cooperation in the planning of plant construction and renovation in order to insure inclusion of proper provisions for maintaining employee health and safety; and (6) promotion of health examinations, medical care programs, and adult hygiene programs.

The Division of Industrial Hygiene, in addition, aided in developing industrial hygiene services in States which had not previously provided them, advised directors of industrial hygiene programs in States in which such programs were already established, and offered guidance to State health departments on all matters pertaining to industrial hygiene. In order to render more effective and complete assistance to the States, the Division established special sections for providing dermatology, dental hygiene, industrial nursing, and health education services.

Federal industrial hygiene personnel functioned during the war within the various State industrial hygiene organizations and devoted their full time to giving service directly to war industry establishments. The duties of the individual industrial hygiene physician included evaluating health facilities and services in industrial plants; promoting the idea of physical examinations for workers; encouraging accurate reporting of occupational diseases; carrying on studies designed to eliminate dangerous conditions of work; cooperating with local medical societies and health agencies on industrial medical care programs; and offering consultation services to private physicians engaged in treating cases of occupational illness.

The main tasks of Service engineers assigned to industrial hygiene work were: (1) to determine where major emphasis should be placed



A foundry worker wearing a safety legging of chrome leather reinforced with steel; with one swift motion he can tear the legging off in case the molten metal splashes his leg. This was one of the numerous devices perfected during the war for protection of industrial workers against accidents and other health hazards.

in efforts to control health hazards in war industry plants; and (2) to recommend methods for improving plant illumination and sanitation, abating noise, and protecting plant employees against fumes, gases, dusts, and toxic substances of various kinds.

Chemists assisted the physicians and engineers by performing required analytical work and developing instruments and techniques applicable in the solution of particular industrial hygiene problems.

Nursing consultants in industrial hygiene were also furnished to the States by the Service. They helped to plan nursing services for small plants and encouraged larger enterprises to hire regular staff nurses for the benefit of their employees. Some of them were consulted, also, on dermatological and dental hygiene problems.

In addition to the aid it provided to States and local communities, the Service rendered valuable assistance in the field of industrial hygiene to the Army. Certain Government-owned munitions plants and arsenals were investigated by industrial hygiene specialists from the Service at the request of the War Department, and confidential reports on conditions in these plants were submitted to the Department. These reports usually contained recommendations for improvement of sanitation facilities and medical services provided for employees in the plants investigated.

### Research and Laboratory Services

Laboratory research in industrial hygiene performed during the war by the Service was mainly concerned with attempting to solve those problems caused or intensified by the national emphasis on war production. Entire new industries, using a wide range of chemical substances, had sprung up in answer to the need for war materials. A good many of the industrial hygiene research projects begun during the war, therefore, sought to determine maximum amounts of specific chemical substances to which workers might safely be exposed.

Funds from emergency health and sanitation appropriations were also devoted to special research in industrial hygiene requested by the War and Navy Departments, State health departments, and certain war industries. Projects of this kind included:

(1) Development of methods for analyzing poisonous gases, dusts, and vapors which collected in arsenals and war industries.

(2) Studies in aviation medicine, including:

- a.* Evaluation of the physiological effects of a new oxygen-inhaling apparatus, at the request of the Navy.
- b.* Determination of the efficiency of flight apparel, especially electrically heated clothing, at the joint request of the Navy and the Quartermaster General of the Army.
- c.* Evaluation of equipment for increasing visual efficiency, at the request of the Navy.
- d.* Investigation of the physiological and pathological effects on the human body of rapid decompression from high to low atmospheric pressures.
- e.* Determination of the effects of new antimalarial drugs on the combat efficiency of aviators.

(3) Investigation for the Army, Navy, and Marine Corps of the best means of supplying food and water to combat personnel, including determination of methods of rendering sea water potable and analysis of new materials employed in the manufacture of mess equipment to discover whether or not these materials were potentially dangerous to human beings.

(4) Investigation of the toxicity and other possibly dangerous characteristics of new solvents widely used in war industries.

(5) Determination of the toxicity and potential harmfulness of new chemicals used in the manufacture of synthetic rubber and in recapping old tires.

(6) Study of the toxicity of new metals used in airplanes, motor vehicles, and munitions.

(7) Development of psychological and physiological tests for detection of fatigue and for determination of the relationship of fatigue

to hours and types of work and to incidence of poisoning from certain groups of solvents.

(8) Evaluation of the practicability and effectiveness of commercial ultraviolet lamps and various aerosols for controlling infectious diseases in barracks, submarines, and transports.

(9) Development of methods for controlling health hazards involved in work with radioactive paints, especially in the manufacture of luminous instrument dials for airplanes.

### *Tuberculosis Control*

The extent of the spread of tuberculosis during the first World War and the rise in the rate of deaths from this disease that had taken place in Great Britain after 1939 were recognized by tuberculosis experts in this country, on the eve of American participation in the war, as warning signs that unless more adequate control measures were initiated, the United States might well experience a marked increase in tuberculosis incidence as a result of wartime conditions.

Immediately after Pearl Harbor, in January 1942, the Public Health Service began to step up its tuberculosis control program. Funds from the emergency health and sanitation appropriation were allotted for establishment of a Tuberculosis Control Section in the States Relations Division. This Section cooperated with the National Institute of Health's Division of Industrial Hygiene in carrying out a wartime tuberculosis control program which included the following activities:

- (1) X-ray examinations of United States Coast Guard recruits;
- (2) X-ray examinations of workers in war industries;
- (3) X-ray examinations of persons in war industry communities;
- (4) Development, in cooperation with the Selective Service System, the Navy, and State health departments, of methods for recording data on young men rejected for service because of tuberculosis;



Employees line up for chest X-ray examinations. The Tuberculosis Control Division conducted many examinations of this type during the war.



A physician "double checks" the X-ray diagnosis by comparing small film and large, confirmatory chest plate.

(5) Provision of consultation services to State health departments to aid them in organizing tuberculosis control programs.

The Tuberculosis Control Section developed an examination technique, employing photofluorographic units, whereby it was possible for one physician and two assistants to X-ray between 500 and 700 people in a single day.

From the inception of the control program up to June 30, 1944, 831,989 persons were given chest X-rays by the Public Health Service. Among those examined were industrial workers in 20 States, Federal employees in Washington, D. C., and migratory farm workers from Mexico and Jamaica. One and one-half percent of the first 418,608 persons examined were found to have X-ray evidence of reinfection tuberculosis. In addition, the Service performed chest X-rays on all men inducted into the United States Coast Guard and on merchant seamen in training at Manhattan Beach, in New York City.

An effort was made by the Tuberculosis Control Section to have all known tuberculosis cases followed up and to have adequate records kept on them. Through the Public Health Service district offices, State and local tuberculosis control authorities were assisted in reorganizing their activities and developing better methods of record keeping. Research on techniques for improving tuberculosis case finding and control methods was undertaken by the Section in cooperation with the National Institute of Health.

During fiscal year 1945, the Tuberculosis Control Section became a Division in the Bureau of State Services.

### *Establishment of Blood Banks*

As a precaution against possible enemy attack from the air or other emergencies, it became necessary, after the United States entered the war, to build up reservoirs of blood plasma in both vulnerable coastal cities and vital industrial centers in the interior of the country. Stockpiling was begun in April 1942, with an initial allocation from the President's Emergency Fund, and it was continued during fiscal years 1942 and 1943 with money from the emergency health and sanitation appropriation to the Public Health Service. Public Health Service personnel administered the program, although it was organized by the Medical Division of the Office of Civilian Defense.

Numerous depots of frozen or dried plasma or serum albumin were set up under this program. Technical and financial assistance in establishing and maintaining blood reservoirs was provided to selected civilian hospitals. The plasma, when collected, was used to meet current local needs and to build up a reserve supply. Hospitals selected were required to have a bed capacity of at least 200—a size considered desirable for the proper operation of blood and plasma banks.

Each participating hospital was expected to accumulate a reserve stock of liquid or frozen plasma amounting to at least one unit per bed. (A unit of plasma can be obtained from 500 cubic centimeters, or 1 pint, of blood.) Whole blood, from which the plasma was obtained, was collected from volunteer donors by each hospital. In some instances, blood for plasma production was supplied to the Office of Civilian Defense through the Red Cross.

By the end of fiscal year 1943, 158,290 units of plasma were available in hospitals and reserve depots in 316 communities in the United States and at strategic points in Alaska and Puerto Rico. The Public Health Service provided 79,500 of these units and participating hospitals 78,790.

It was also important for all large communities to have on hand adequate supplies of blood and plasma or human serum albumin for the treatment of casualties other than those which might result in the event of enemy action; the life saving properties of whole blood and blood derivatives were equally valuable in cases of severe burns or other serious accidents involving shock. Plasma reservoirs saved many lives in wartime disasters, including the Coconut Grove nightclub fire in Boston, the wreck of the Pennsylvania Railroad's Congressional Limited at Philadelphia, and numerous fires, explosions, and other accidents in war plants.

At the end of the war, the Surgeon General of the Public Health Service contributed the Civilian Defense Office's plasma reserve of 25,000 units of commercially frozen plasma to nonprofit hospitals and State health departments. Approximately 15,000 units of dried plasma were transferred to the Army in 1945 by local civilian defense councils.

### *The Lanham Act*

By the terms of the Lanham (Community Facilities) Act, passed in 1941, Congress authorized the expenditure of \$150,000,000<sup>13</sup> to remedy acute shortages of facilities considered necessary to the health and welfare of communities affected by the influx of defense workers and military personnel. It was the intent of the act to provide such facilities in localities where shortages were determined by the President to exist or to be impending. The Federal Works Agency was charged with administering the act and allocating authorized funds to the best advantage.

In order to fulfill this responsibility adequately, the Federal Works Administrator needed to know in which critical defense areas of the Nation shortages of community health and welfare facilities were most pressing. To gain this knowledge, he enlisted the aid of other governmental agencies. The Public Health Service was called upon to analyze community requirements for new health and sanitation facilities and to aid the Federal Works Agency in determining which local areas would benefit most from the expenditure of Lanham Act funds for provision of such facilities.

On the basis of its experience with its own community reconnaissance surveys, the Service concluded that the best means for obtaining the information required by the Federal Works Agency was to use the survey technique. Accordingly, teams of Service personnel were sent to numerous local communities throughout the Nation to investigate existing and proposed health and sanitation facilities, assess major needs for new construction, and certify to the Federal Works Agency projects which were most essential to the success of the defense effort. It was only if they were so certified that facilities such as emergency waterworks, hospitals, health centers, sanitary privies and septic tanks, and garbage disposal systems could be constructed with funds provided under the Lanham Act.

The surveys for assessing the relative need in each community for such projects were conducted by teams composed, usually, of one medical officer and one engineer from the appropriate Public Health Service district office; these teams carried out their investigations

---

<sup>13</sup> Additional appropriations were made for the construction of community public works by Public Law 150 (1941) and Public Law 371 (1941).

in close cooperation with State and local health departments. A special guide form was used by each team in collecting the required data on a particular community, thus insuring that information gathered from the surveys would be uniform as well as complete.

Assembling and analyzing the data contained in the survey reports was the duty of the Surveys and Information Section of the Service's Sanitary Engineering Division. The material collected from each community survey was brought up to date at least once each year until the close of hostilities.

The surveys were broken down geographically, for purposes of analysis, into 12 groups, comprising the 8 Public Health Service Districts in the continental United States, and the Territories of Hawaii, Alaska, Puerto Rico, and the Virgin Islands. A further break-down of the survey reports within each Public Health Service District was made according to critical war industry and military encampment areas in each State.

Conducting community facilities surveys, however, was only the initial phase of the work performed by the Public Health Service in assisting the Federal Works Agency to implement the provisions of the Lanham Act. It was also the duty of the Service to prepare project applications in certain cases, and to provide technical review of actual construction plans for health and sanitation facilities built with Lanham Act funds.

A Community Facilities Section was established in the States Relations Division of the Service for the purpose of reviewing and certifying applications to the Federal Works Agency by States and local communities for grants under the Lanham Act. The Hospital Facilities Section of the States Relations Division acted as consultant to the Agency on all matters pertaining to construction of medical facilities and provision of medical services under the act. The Sanitary Engineering Division of the Service performed a similar job with respect to provision of new sanitary facilities.

The primary function of the Hospital Facilities Section in connection with administration of the Lanham Act was to furnish the Federal Works Agency with recommendations on community requirements for hospitals and health centers. The Section also submitted recommendations on applications for aid in meeting maintenance and operating costs made by general hospitals constructed with Lanham Act funds. These recommendations were based on special field surveys undertaken by the Service's district office personnel.

It was, furthermore, the responsibility of the Hospital Facilities Section to work out, jointly with the Federal Works Agency, policies governing these field surveys, to give technical guidance on survey procedures to the district offices, and to coordinate its own efforts

## Health Facilities Built Under the Lanham Act



A water storage tank, with a capacity of 2,500,000 gallons, constructed as part of the water supply system of Miami, Fla. One of the largest reservoirs of its kind, the tank is 144 feet in diameter and 22 feet in height.



Kapalama incinerator, Honolulu, Hawaii.



Pulaski County health center, Waynesville, Mo.



Calhoun County health center, Anniston, Ala.



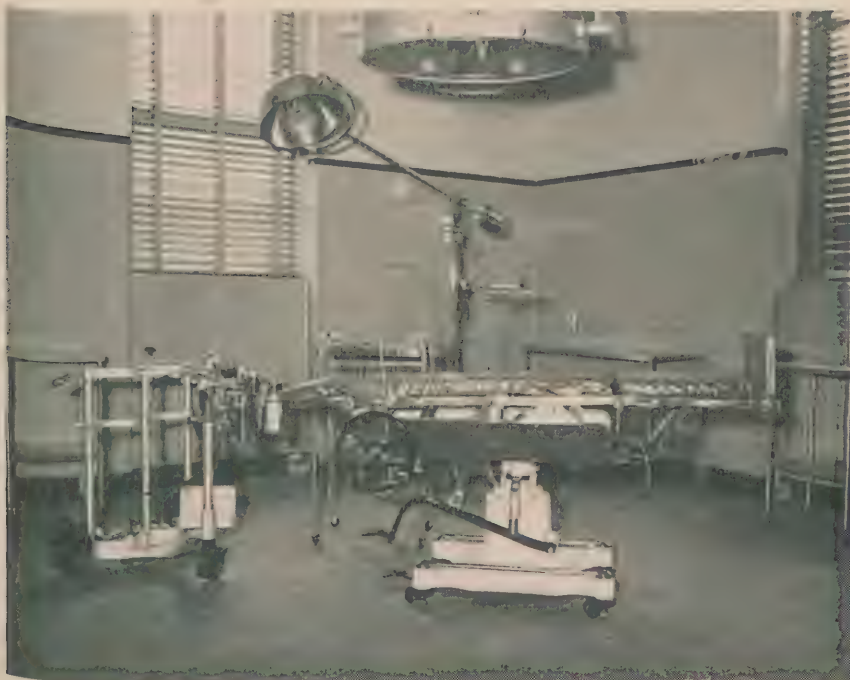
One of the sun decks in the hospital at Sylacauga, Ala.



Nursery, with mural by Walt Disney; St. Joseph Hospital, Burbank, Calif.



Approach to main entrance, Northern Permanente Hospital, Vancouver, Wash.



An operating room, De Paul Hospital, Norfolk, Va.

along these lines with those of other appropriate units of the Service.

Another type of service rendered by the Section in connection with the community facilities program was establishment of standards for the planning and designing of hospitals and other health facilities. To overcome the acute wartime shortage of construction materials, architects employed by the Section developed a single-story type of structural plan for hospitals and health centers.

The community facilities program resulted in creation of a substantial number of new hospital beds—estimated at approximately 25,000 by December 31, 1944—but it did not necessarily provide hospital beds in all communities where they were needed. Under the terms of the Lanham Act, allocations for hospital construction projects could be made by the Federal Works Agency only to communities in which war activities made it absolutely essential for hospital facilities to be provided or increased. Consequently, many requests by communities not engaged in major war activities for Lanham Act funds for needed hospital construction projects were disallowed.

War public works projects totaling 4,058 were constructed with financial assistance from the Federal Works Agency under the provisions of the Lanham Act. These included schools; general hospitals, health centers, clinics, and venereal disease rapid treatment centers; waterworks and sewer system; streets and highways; recreation centers; and police and fire protection facilities. The total cost of these projects amounted to \$456,469,479, of which \$358,370,717, allocated by the Federal Works Agency, represented the contribution of the Federal Government. Hospitals and allied health facilities accounted for 874 of these projects, and water and sewer installations for 905. Total expenditures for the former under the act were \$121,734,247, of which \$93,889,652 was granted by the Federal Works Agency; for the latter, the Agency allotted \$132,749,331 out of a total amount of \$169,771,471 expended.

In addition, the Agency also disbursed \$115,670,532 to assist communities in maintaining and operating hospitals, health centers, schools, and other public facilities. This was a substantial share of the total of about \$383,000,000 estimated to have been expended by all governmental authorities on operation and maintenance of such facilities during the war.<sup>14</sup>

### *Boulder City Hospital*

In 1940, the schedule for installation of electricity-generating units at Boulder Dam, on the Arizona-Nevada border, was greatly accelerated as a preparedness measure. As part of this project, construction

<sup>14</sup> Data on Lanham Act expenditures obtained from the Office of Program Reports, Federal Works Agency.

of an \$80,000,000 magnesium plant was begun 8 miles from Boulder City, Nev., on the road to Las Vegas. During the next 2 years, the population of the region increased to 35,000, and that of Boulder City rose to 7,000. Hospital facilities in Las Vegas became so overcrowded that it was soon impossible for institutions in that town to admit further cases from Boulder City. A small hospital had been built in close proximity to the magnesium plant, but it was hardly large enough to accommodate all the plant's employees.

Accordingly, arrangements were made by the Interior Department's Bureau of Reclamation, in the autumn of 1943, to establish a hospital in Boulder City. The Bureau decided to use for this purpose a building which had been formerly operated as a hospital, but which was being used for other purposes in 1943 by the Department's National Park Service. Since the Bureau had had little experience in operating hospitals, it requested the Public Health Service to assume responsibility for running the Boulder City Hospital, with funds to be provided by the Interior Department. The Service accepted this assignment, and the hospital was placed under the direct supervision of the Hospital Facilities Section of the States Relations Division for the duration of the war.

### *Liberian Health Mission*

A Public Health Service mission was sent to the African republic of Liberia, in 1945, to complement the health work being carried on by the United States Army and Navy within their own cantonments in that country. The mission's assigned functions were: to help the Liberian Government expand its own health program; to plan for the construction of health facilities in port towns where foreign ships might dock; to develop local hospitals for the civilian population; and to free airports of species of mosquitoes which, if introduced into the United States, might spread dangerous diseases.

The staff of the mission included physicians, dentists, sanitary engineers, public health nurses, and an entomologist. The project was financed by emergency health and sanitation funds, and was headed by a senior surgeon in the Commissioned Corps of the Public Health Service.

Since Liberia possessed an extremely small number of qualified physicians and was unable to recruit foreign doctors because of the war, the physicians attached to the Public Health Service mission arrived in that country at a time when their services were sorely needed. They soon found that the types of diseases most prevalent in Liberia were malaria, fly-borne infections, and gastrointestinal ailments,



An English lesson being given to Liberian nurses. The teacher is a health education officer of the Public Health Service.



A filtered water reservoir in Liberia being inspected by a Public Health Service engineer officer. Constructed from salvaged materials, this plant served the Liberian Government Hospital and the headquarters of the Service mission.

and began immediately to institute procedures for control of these maladies.

Swamp drainage was inaugurated by the mission's engineers, with a resulting reduction in malaria incidence; drainage operations were also responsible for reclamation of large tracts of swampland which had been previously uncultivable. A staff specialist in health education talked to the natives on methods of preventing and controlling disease. The talks were translated into native languages in sections of the country where English was not spoken. Printed material on health was also distributed. The two hospitals in Liberia were used for demonstration purposes by the mission staff, and wells, latrines, and a water-filtration plant were built in various parts of the country. The mission's entomologist recorded the number of certain disease-carrying insects present in different areas of Liberia, and surveys of school children were conducted by other members of the mission staff to determine incidence of hookworm among them.

In addition, the mission established a school to train Liberians as subprofessional medical, dental, and laboratory technicians and engineering aids.

The Liberian mission was placed under the supervision of the Office of International Health Relations when that Office was established in the Public Health Service in 1946.

### *Water and Food Sanitation*

Standards of milk and food sanitation showed a marked tendency to decline during the war years in many regions of the United States. Hasty construction of eating places, difficulty in acquiring approved sanitary equipment, overcrowding, and lack of trained food handlers—all these factors contributed to deterioration of traditional standards in this important area of public health activity.

Consequently, it was incumbent on those Public Health Service officials administering the emergency health and sanitation program to assume increased responsibility for maintenance of proper milk and food sanitation procedures in many parts of the country, especially in critical industrial and extracantonment zones. Their duties in this connection entailed:

- (1) Preparation and revision of sanitary standards—recommended for adoption to States and local communities—for restaurants and for processing of milk and frozen desserts;
- (2) Rendering of advisory service to States through consultations between State health officials and milk and food specialists in Public Health Services district offices and in the Milk and Food Section of the Service's Sanitary Engineering Division;

- (3) Supervision of milk and food handling on interstate carriers;
- (4) Preparation of educational material;
- (5) Cooperation with other Federal agencies in efforts to get adequate rules of milk and food sanitation adopted and enforced;
- (6) Compilation of statistics on occurrences of disease traceable to inadequate observation of principles of milk and food sanitation.

Milk specialists in the Public Health Service districts, in cooperation with the Army, the Navy, and State and local health departments, made sure that adequate supplies of pure milk were available for soldiers, sailors, and war workers. To accumulate basic data for their work, these district specialists conducted milk sanitation surveys in 36 communities in cooperation with State health authorities.

To check effectively on purity of water supplies, maintenance of stream sanitation, hygienic disposal of sewage and industrial wastes, and sanitary operation of bathing facilities in vital extracantonment areas, it became necessary, as the war continued, for the Service to provide facilities for laboratory analysis in these areas.

The need was economically and efficiently met, beginning in fiscal year 1943, by acquisition of six mobile trailers staffed with trained bacteriologists and chemists. The trailers, bought with funds from the emergency health and sanitation appropriation to the Public Health Service, could be moved to communities where they could be most useful with a minimum loss of time.

In-service training was provided for 6,500 State and local sanitarians by means of 98 milk and restaurant sanitation seminars. In 88 war areas where laboratory facilities were lacking, thousands of samples of water, milk, and restaurant utensils were analyzed in trailer laboratories sent out by district offices of the Service; 284 schools for food and milk handlers were conducted by the district offices on a demonstration basis; attendance at these schools totaled 97,000.

Under the stimulation of these activities on the part of Service personnel, schools were set up by many States and communities to train milk and food handlers. Educational materials for these schools were prepared by the Service's Division of Public Health Methods.

Reports from State health departments during 1943 mentioned 389 outbreaks of disease, affecting 23,765 persons, attributable to faulty food sanitation. Of these outbreaks, 26 were traced to water, 40 to milk and milk products, and 285 to other foods, while in 38 the source was undetermined. The work of the Public Health Service, beginning in 1943, in the field of emergency water, milk, and food sanitation was instrumental in reducing the number of disease outbreaks traceable to impure food products during the remainder of the war years.



A sanitary engineer's mobile laboratory. The unit pictured is parked in front of the main building, National Institutes of Health, Bethesda, Md.



Interior of a mobile laboratory. The Public Health Service provided laboratory services during the war, by means of such mobile units, to communities in which shortages of trained laboratory personnel existed.

### Protection of Water Supplies

The Federal Bureau of Investigation and the Intelligence Divisions of the Army and Navy, through a special coordinating committee on which all three agencies were represented, requested assistance from the Public Health Service, in October 1941, in developing a plan for insuring maintenance of safe and adequate domestic water supplies during the period of national emergency. Presidential Executive Order No. 9165, dated May 19, 1942, specifically directed the Service to perform this task, which was considered of fundamental importance to the national security.

Before this "facilities security" plan (as it was called) went into effect, some State waterworks engineers had already made preliminary surveys of community water sources, and the information thus assembled was used by Service engineers in working out a program for protecting the Nation's water resources.

The main objective of the program was to provide a constant supply of water sufficiently pure to be useful for both military installations and war industry plants. Emphasis was placed by the Service, therefore, on preservation of the quality of water as well as on protection of water sources against possible sabotage.

The facilities security program was conducted with the assistance of State departments of health. A total of 640 public water supply systems were inspected by Service and State health officials and recommendations for improving deficiencies in plant operation and sanitation, meeting plant needs, and changing personnel policies and plant security measures were submitted when appropriate. Reinspection and follow-up took place in 289 of these cases.

The program remained in effect during fiscal years 1943 and 1944.

### *Venereal Disease Control in the Caribbean*

The islands in the Caribbean Sea are of great strategic importance to the United States in wartime, forming as they do a natural defense line for the Western Hemisphere. Early in World War II, the United States selected several sites in the British West Indies as desirable for military bases. In September 1940, through an agreement with Britain, these sites were leased by the United States for 99 years.

The two powers established an Anglo-American Caribbean Commission to consider matters of mutual interest which were likely to arise under the leasing agreement. Not long after its establishment, the Commission had to deal with a problem which began to assume increasing importance as American troops were dispatched in force to the Caribbean area—the high venereal disease rate among members of the armed forces of both countries stationed in Trinidad and other

Caribbean bases. Several conferences were held between the Commission and officers of both armies to consider the best means of combating this situation, as a result of which it was decided:

(1) To supplement the medical facilities of the British and United States armed forces by organization of educational, recreational, and intensive prophylactic programs for military and naval personnel of both countries.

(2) To develop an immediate and practical venereal disease control program among civilians in the Caribbean area—an approach which, it was believed, would help to reduce the rate of incidence among members of the armed forces and would lead, eventually, to reduction of venereal disease morbidity among civilians as well.

At the request of the American Secretary of War, the Surgeon General of the Public Health Service, through the Venereal Disease Division, detailed a venereal disease control officer, assisted by a small staff, to the Caribbean area to help carry out these decisions. Personnel participating in the control program included both general administrative and field control workers. Facilities and services established by the control staff included a central diagnostic clinic, a laboratory and an X-ray unit, a nursing service, field clinics, and epidemiological unit; educational materials were also provided. Headquarters of the program were in Trinidad, which was centrally located with respect to other troop concentration areas in the Caribbean region.

Funds other than those regularly appropriated to the Venereal Disease Division of the Service had to be used for this program because the Division had no authority, under the basic legislation covering its activities, to expend money for venereal disease control in areas outside the continental United States and its Territories. Although the Venereal Disease Division cooperated in organizing the control program in the Caribbean area, this program was not actually an integral part of the control activities undertaken by the Division in connection with the national emergency.<sup>15</sup>

During fiscal year 1944-45, funds allocated from the appropriation for emergency health and sanitation work for control of venereal disease in the Caribbean islands were supplemented, on a matching basis, by grants from the British Government.

### *Health Education*

During the war years, health agencies throughout the country constantly emphasized the fact that maintenance of personal and community health would be an immense contribution to the successful

<sup>15</sup> An account of some of the other wartime activities carried out by the Venereal Disease Division is given on pp. 69-78.

prosecution of the war. It became increasingly evident during this period, however, that a high level of personal and community health could not be maintained if individual citizens were not instructed in methods of promoting and attaining good health.

Health education became, consequently, one of the essential phases of the emergency health and sanitation program carried on by the Public Health Service. Health education consultants were assigned by the Service to its various district offices to give advice to State health education specialists. Health educators were assigned to local communities in States in which critical defense areas were located to demonstrate the effectiveness of health education organized on a community-wide basis. Teachers, unoccupied during the summer months, were trained to play a key role in health education programs in their home communities.

As a result of the efforts of these health education workers, many communities corrected conditions menacing the health of both civilian populations and troops stationed in nearby camps.

Health education played a vital part, for example, in malaria control and industrial hygiene activities. The community education campaign which was part of the malaria control program was responsible, to a great extent, for reducing malaria incidence in areas surrounding military and industrial establishments in sections of the South in which the disease had traditionally been endemic. In war industries, health education techniques were effectively used to show workers how to protect themselves against health hazards to which they were exposed.

Pamphlets, posters, pictures, and other information materials, published by the Division of Public Health Methods of the Service, were employed to good advantage in the emergency health education program.

### *Provision of Health Care in War Housing Projects*

Formal agreement was reached between the Public Health Service and the Federal Public Housing Authority early in 1942 on assignment of trained Service personnel to the Authority in order to develop a health and sanitation program in war housing installations. The first group of personnel assigned consisted of a physician, dentist, engineer, statistician, and health economist. This staff was responsible for development of health policies and procedures for the Federal Public Housing Authority, and was instrumental in arranging for the furnishing of services by emergency health and sanitation personnel in localities where war housing projects were built.

Although, in general, sanitary engineering activities were stressed in this program, preventive health services were also provided through

part-time staffing by Service personnel of local health department clinic facilities in approximately 500 war housing projects. This was possible because war housing usually was built in areas where local health department staffs were already augmented by the assignment of emergency health and sanitation personnel.

Approximately 50 infirmaries were built by the Federal Public Housing Authority in war housing projects and about 35 of them were always in operation during the war period. They were provided to make bed care available to tenants who could not otherwise be nursed satisfactorily through minor illnesses and convalescence. Public Health Service nurses were assigned to these infirmaries, funds being transferred by the Federal Public Housing Authority to the Service to cover the costs involved. In one city—Mobile, Ala.—medical and dental officers of the Service were assigned on a full-time basis for a short period to provide care to tenants in projects constructed by the Authority.

It was a basic policy of the Federal Public Housing Authority to use existing local and State health agencies in carrying out health and sanitation activities in and around housing projects. Only in rare instances did the Authority undertake to provide direct health services, and these were usually furnished by Public Health Service engineers detailed to the central and regional offices of the Authority. Because there were more than 40 cafeterias on the West Coast operated by the Federal Public Housing Authority, a food sanitarian was assigned by the Service to the San Francisco office of the Authority to work full time on restaurant sanitation problems.

Although engineering and sanitation personnel participating in this program were carried on the Public Health Service pay roll, funds for their salaries were supplied by the Authority.

### *Cooperation With the Public Roads Administration*

#### **Inter-American Highway**

Included as part of the Public Health Service's emergency health and sanitation program were activities connected with construction of the Inter-American Highway in Mexico and Central America. Service personnel were detailed to collect information on disease prevalence and availability of water along the highway route so that, in case the course of the war required that the road be used for transporting men and supplies to bases in the Canal Zone, proper health precautions could be taken by military authorities. Certain health services were also furnished by Service personnel assigned to this project to workers engaged in constructing the international road.

Teams composed of Service physicians, entomologists, sanitary engineers, and administrative personnel, conducted surveys of areas in

the neighborhood of the highway route in order to obtain the required data. These teams were instructed not only to gather essential information on health and sanitation conditions along the road, but to make what improvements they could where such conditions were unfavorable.

Improvements in community health and sanitation made by the survey teams in selected areas along the highway benefited not only local inhabitants of these areas, but also tourists and visitors. Many other communities along the route of the highway—towns and villages which could not be covered by the survey teams—were also stimulated thereby to raise their own standards of health and sanitation.

The health of road workers engaged in actual construction of the Inter-American Highway was protected by a series of small health stations established at intervals along the road and operated by physicians and sanitary engineers who were members of the survey teams.

Beginning in fiscal year 1945, the Public Roads Administration reimbursed the Service for expenses incurred in connection with maintaining and supplying personnel attached to the highway project.

### **Alaska Highway**

At the request of the Federal Works Agency, the Public Health Service likewise assisted in the operation of hospitals and clinics along the Alaska Highway, which was being built by the Public Roads Administration.

Under terms of an agreement between it and the Federal Works Agency, the Service undertook to recruit all personnel needed to operate these facilities. It also agreed to build and equip hospitals, provide ambulances, furnish transportation, and meet any other needs for personnel or equipment which might arise.

Sanitary engineers were stationed at certain points along the highway route to make periodic inspections of construction camps; they made recommendations for the correction of conditions in these camps which did not conform to standards of sanitation set up by the Service's Sanitary Engineering Division.

In order to insure that all drinking water used in construction camps along the highway was potable, the engineers collected samples of water each week from these camps and shipped them by Air Transport Command planes to the water-analysis laboratory at Whitehorse, Alaska. Emergency chlorination units, when they finally became available, were of great assistance in handling the water purification problem, and adequate chlorination of all water used in the camps was insisted upon by Service officers.



Part of the Alaska Highway trail winding along a ridge.

### *Cooperation With the Office of Civilian Defense*

Throughout World War II, there existed the possibility of surprise bombing attacks by the enemy on American industrial centers. It was imperative, therefore, that special facilities be prepared to provide emergency medical and allied services for the civilian population of the United States in case such attacks occurred. Primary responsibility for planning, coordinating, and carrying out measures for the provision of these facilities was given to the Medical Division of the Office of Civilian Defense. This organization was on the job as early as 1941, even before the Japanese attack on Pearl Harbor.

The Public Health Service played an important role in developing the program of the Medical Division of the Office of Civilian Defense. Officers of the Service—both medical and nonmedical—were assigned to work with the Office. In fact, virtually all professional personnel in the Office of Civilian Defense Medical Division were Service officers. Some of them were assigned to central headquarters of the Office in Washington, D. C.; others were attached to regional Office of Civilian Defense headquarters. Each Office of Civilian Defense regional director had at least one medical and one sanitary engineering officer from the Service on his staff.

Medical officers assigned to the Office of Civilian Defense concentrated on developing comprehensive procedures for carrying out such

emergency activities as treatment and care of civilian casualties resulting from possible enemy air attacks; protection and, if necessary, evacuation of civilian hospitals; and operation of medical field units.

The sanitary engineering officers on the Office of Civilian Defense staff devoted their attention mainly to problems related to protection of community water supplies in emergency situations. Their major objective was to insure that every important public waterworks system would be prepared to maintain service under adverse circumstances and to render prompt aid, when necessary, to neighboring communities. To this end, they developed a "mutual aid" plan for waterworks systems, involving movement of waterworks technicians and other personnel, in the event of an emergency, from their own to other communities where their special skills might be more urgently needed. Home precautions for citizens concerning use of water during emergencies were also worked out and disseminated to local communities.

In addition to placing special emphasis on maintenance of water supplies during emergencies, sanitary engineer officers assigned to the Office of Civilian Defense expended considerable effort in attempts to improve environmental sanitation procedures in local communities. They outlined programs for the training of volunteer sanitation workers and tried, through consultation with local officials, to raise standards of sanitation work in municipal health departments and related official agencies with the idea of better preparing these bodies to handle emergency situations should they arise. They recommended that local communities throughout the country initiate and develop programs of emergency planning in environmental sanitation, involving joint action by water supply, public health, fire, and other appropriate administrative departments.

Medical and sanitary engineering officers of the Service cooperated in the development of a gas defense program, under the auspices of Office of Civilian Defense's Medical Division. Several chemists and other types of scientists were assigned by the Service to work with the medical officers and sanitary engineers on this program. Field decontamination procedures were supervised by sanitary engineers in Office of Civilian Defense regional headquarters.

Although the work of the Office of Civilian Defense Medical Division was largely financed from the President's Emergency Fund, certain members of the Office staff were paid from emergency health and sanitation appropriations.

## *Miscellaneous Services to Federal Agencies*

### **Office of Strategic Services**

A Public Health Service medical officer was detailed during the war period as liaison officer to the Office of Strategic Services. He was given duties of a confidential nature, involving the compilation of reports on health conditions in various regions of the world where strategic considerations dictated that American armed forces should be sent. His reports included not only all available health information on these areas, but also recommendations for preserving the health of military personnel stationed in them.

### **War Department**

In 1945, the War Department requested the Public Health Service to appoint two medical officers to serve with the Strategic Bombing Survey as members of a group assigned to study the effects on Germany's principal cities of Allied strategic bombing. Among the objectives of this survey was the determination of the type and adequacy of civilian defense organization in Germany and its performance record during the war years. Service representatives on the survey team concentrated on analyzing emergency medical procedures and gas protection techniques employed in German cities.

Public Health Service officers were also sent to Japan, after VJ-day, in order to help assess the effects of American bombing of that country.

Sanitary engineering personnel were loaned by the Service to the Army Corps of Engineers, at the request of the War Department, to investigate pollution in the Missouri, James, and Rappahannock Rivers.

Studies of waste disposal in plants manufacturing explosives were also made by Service personnel for the Ordnance Division of the Army.

### **War Production Board**

Public Health Service engineers were assigned to the War Production Board to make inspections in localities requesting priorities on materials for construction of water supply systems, sewage treatment works, and other sanitary facilities. The engineers submitted their findings to the Board, which gave great weight to these reports in allocating priorities on scarce materials.

### **Foreign Economic Administration**

Public Health Service medical personnel were temporarily transferred, in the course of the war, to the Foreign Economic Administration, at the request of the State Department, to serve with American economic missions located in strategic parts of the world.

### **Office of the Coordinator of Inter-American Affairs**

A medical officer of the Public Health Service was loaned to the Office of the Coordinator of Inter-American Affairs<sup>16</sup> to direct its war-time public health training program for professional health workers from various American nations. The program was conducted in schools, colleges, and universities in the United States and its Territories.

### **War Food Administration**

Both the Office of Labor and the Farm Security Administration of the War Food Administration used Public Health Service personnel on their staffs during the war. Medical officers of the Service were used by the Farm Security Administration to conduct medical care programs among low-income farmers, and by the Office of Labor in its medical care plan for migratory farm workers.

### **Office of War Information**

A Public Health Service physician supervised physical examinations and inoculations given to personnel appointed by the Office of War Information to serve in various overseas posts.

### **Office of Scientific Research and Development**

The Service also assigned personnel to the Office of Scientific Research and Development to assist a special staff conducting research on health subjects from the standpoint of their specific relation to national defense.

---

<sup>16</sup> This agency was renamed the Office of Inter-American Affairs in May 1946 and the Institute of Inter-American Affairs in June 1947.

## Related Wartime Health Programs

Many health services of an emergency nature provided to the American people during the war years were not carried out under authority of the specific appropriations for emergency health and sanitation activities. Some of them, however, supplemented in important respects the services for which emergency health and sanitation funds were appropriated. Others were furnished as part of larger programs connected with other aspects of the war effort—programs in which the Public Health Service participated whenever its particular skills or experience could be made use of. Essentially, all these services—regardless of the auspices under which they were provided or the language of the appropriations by which they were financed—were directed toward one end—that of keeping the civilian and military population of the United States as healthy as possible so that successful prosecution of the war against the Axis Powers would not be hindered.

### *Relocation of Medical Personnel*

The Public Health Service worked in close collaboration with the War Manpower Commission's Procurement and Assignment Service on special surveys conducted for the purpose of discovering in which communities shortages of physicians and dentists existed or were likely to occur. The War Manpower Commission hoped to gain from these surveys information which would help it in fixing quotas of physicians and dentists available for military or other assignment.

By March 1, 1943, studies had been completed for 33 communities in 16 States reported to be in need of medical personnel. These studies showed that 20 of the 33 communities urgently required additional medical, dental, and nursing personnel.

In an effort to relieve the situation revealed by these surveys, the Procurement and Assignment Service took several measures to help community doctors employ their time to the best advantage. Medical societies and health agencies in some localities were asked to arrange to have physicians remaining in the community extend their services to the largest possible number of patients. An attempt was made to procure additional nurses to make home visits and give bedside care, so that the energies of physicians could be conserved as much as possible.

The Procurement and Assignment Service also tried to persuade physicians who could be spared from one community to move to another where a more urgent need existed for their services. Despite the redistribution of physicians that took place on a voluntary basis as a result of this program, there still remained, in many localities, a pressing need for added medical personnel.

The increasing urgency of this need in some communities prompted Congress to intervene in 1944. A deficiency appropriation act (Public Law 216) passed during that year provided that any political subdivision of a State willing to share the expense involved could, with the approval of the State health department, apply to the Public Health Service for aid in securing a physician or dentist.

Medical and dental personnel participating in this relocation program were required to have the necessary license to practice, to be acceptable to the community requesting aid, and to agree to practice for at least a year in the new location. A physician who entered into a relocation agreement with the Public Health Service was paid \$250 a month for 3 months after moving to a new community. He was also reimbursed for the cost of transporting his family and household effects to the new location. Expenses incurred in relocating a physician or dentist were shared by the Service and the applying community, the former contributing 75 percent and the latter 25 percent.

Because of the restrictions imposed on local communities under this program, applications for physicians were not numerous. During the 6 months that the relocation program remained in operation only 33 community applications were received by the Service—26 for physicians and 7 for dentists. Of the 33 applications received, 9 were acted upon, 6 physicians and 3 dentists being actually transferred to new practices.

The appropriation made under Public Law 216 expired June 30, 1944, and no provision for continuation of the relocation program was included by Congress in appropriations for the fiscal year 1945.

### *Evacuation of Japanese-Americans*

When, for reasons of military security, it became necessary in 1942 to evacuate persons of Japanese ancestry from Pacific Coast areas, the Director of Public Health Service District 5 and the Chief of the Service's Division of Sanitary Reports and Statistics were made responsible for insuring that evacuees were provided with necessary medical services. Actual evacuation, which began about March 1942, was conducted by the Wartime Civil Control Administration, a staff agency set up under the joint jurisdiction of the Fourth Army and the Commanding General, Western Defense Command.

District 5 medical officers took care of the evacuees' health, giving them medical examinations while they were being processed at Western Defense Command control stations and necessary treatment after they arrived at relocation centers maintained by the War Relocation Authority in the Office of Emergency Management. Arrangements for hospitalization for those persons who were too ill to be moved were also made.

Physicians and nurses were provided by the Service to accompany evacuee groups while they were being transported to relocation centers by bus or train. Each control station was staffed by a physician and nurse supplied by the Service. In addition, Service personnel made arrangements with health officers of the areas in which relocation centers were located whereby supervision of the small number of Japanese medical personnel included among the evacuees was provided and normal public health standards within the centers maintained. Because there were so few Japanese doctors and nurses available, additional physicians and nurses from the Service were distributed among the relocation centers. Typhoid and smallpox vaccine were administered to everyone in these centers, and children were immunized against diphtheria.

District Office 5 prepared a manual of regulations on procedure for the relocation center medical service and a complete set of forms for clinical records of patients treated in the centers.

By June 30, 1942, the major part of this evacuation program had been completed. A total of 97,964 evacuees had been processed by this date through the 99 established control stations and sent to relocation centers. In all, about 110,000 Japanese-Americans were eventually evacuated to War Relocation Authority centers.

### *Control of Venereal Disease*

#### **The "Eight-Point Agreement"**

Early in the period of national emergency preceding the entrance of the United States into World War II, representatives of the Army, Navy, Public Health Service, and private agencies interested in health and welfare began to organize, on a cooperative basis, an effective wartime venereal disease control program. A plan of action, known as the "Eight-Point Agreement", was worked out in 1940 by the cooperating organizations. This plan was subsequently adopted by a conference of State and Territorial health officers as a basic program for a venereal disease control campaign during the period of military emergency.

In essence, the program called for efforts to be exerted on Federal, State, and local levels to combat the increase in the rate of venereal disease incidence which, it was anticipated, would occur among indus-

trial workers and members of the armed forces as a result of population dislocations caused by national defense activities. It proposed that these efforts should be carried out in terms of the following eight principles:

(1) Early diagnosis and medical treatment by the Army and the Navy of personnel infected with venereal disease.

(2) Early diagnosis and treatment of infected civilians by local health departments.

(3) Transmission by medical officers of the Army and Navy to State and local health authorities of information regarding possible sources of venereal infection.

(4) Transmission by civilian health authorities to medical officers of the Army and Navy of information on contacts of military and naval personnel with infected civilians.

(5) Forcible isolation of persons infected with syphilis or gonorrhea in communicable form if such persons would not accept treatment.

(6) Repression of commercialized and clandestine prostitution.

(7) Organization of an aggressive program of education among both military personnel and civilians regarding the dangers of venereal disease, methods of preventing venereal infection, and steps to be taken to obtain treatment when needed.

(8) Cooperation between social hygiene and other voluntary organizations and official agencies in stimulating public support for venereal disease control activities.

Further consideration of procedures for meeting wartime venereal disease control problems took place at a National Venereal Disease Control Conference, which assembled in October 1942, at Hot Springs, Ark., under joint auspices of the Public Health Service and the American Neisserian Medical Society. Federal, State, and local health officers, physicians in private practice, and venereal disease control officers of the armed forces attended this meeting.

### **The Social Protection Committee**

Meanwhile, in 1941, a Social Protection Committee had been established in the Office of Defense Health and Welfare Services to facilitate attempts to repress organized prostitution. The Social Protection Committee assisted endeavors of local health officers to eradicate prostitution by developing law enforcement techniques and encouraging the adoption of "self-policing" policies by owners and operators of hotels, rooming houses, bars, and taverns. The "self-policing" idea caught on in many communities, and opportunities for prostitutes to solicit were considerably reduced as a result. Through the efforts of the Social Protection Committee and of State and local officials, prostitution was effectively repressed during the war in more

than 700 communities throughout the country. In 1943, the functions of the Social Protection Committee were transferred to the Division of Social Protection of the Office of Community War Services, in the Federal Security Agency; the Social Protection Division continued in existence until the beginning of fiscal year 1947.

### **Mass Case Finding Under Selective Service**

Syphilis case finding was accomplished on a mass scale in connection with induction of selectees into the armed services. Procedures for syphilis case finding among draftees were arranged on a cooperative basis by Selective Service, the Public Health Service, and State and local health departments. Blood tests were performed as part of the regular physical examinations given to draft registrants, and registrants whose tests showed positive results were followed up by State and local health departments for further diagnosis and, if necessary, for treatment. Among the first 15,000,000 men registered by Selective Service, 728,000 were found to have serologic evidence of syphilis. Of this number, approximately 248,000—after having been followed up and treated—were made available for induction into the armed services unless disqualified for other reasons.

In 1942, the first units of a Nation-wide system of rapid treatment centers for the administration of intensive arsenotherapy—over a period of from one day to several weeks—were established as a wartime emergency measure. Funds for construction, operation, and maintenance of these centers were supplied by the Federal Works Agency, under provisions of the Lanham (Community Facilities) Act. Through treatment in these centers, persons who were infected with syphilis, and from whom the infection could be easily spread in areas with heavy concentrations of military personnel and war workers, were quickly rendered noninfectious. By June 1944, 58 rapid treatment centers had been set up throughout the United States and 25,000 cases of early syphilis had been treated in them.

### **Penicillin Therapy**

With the discovery of penicillin as an antivenereal therapeutic agent, hospitalization of all infectious syphilis cases became possible, since the rapidity of penicillin therapy and the fact that—in contrast to arsenotherapy—it had virtually no toxic effects on patients, permitted a high rate of turnover among hospitalized patients. During fiscal year 1946, 120,000 cases of syphilis were treated—almost all of them with penicillin—in rapid treatment facilities which had been expanded to include beds in general hospitals. This number was equivalent to one-third of all syphilis cases reported to State health departments for that year, and represented a majority of all early syphilis cases treated nationally.

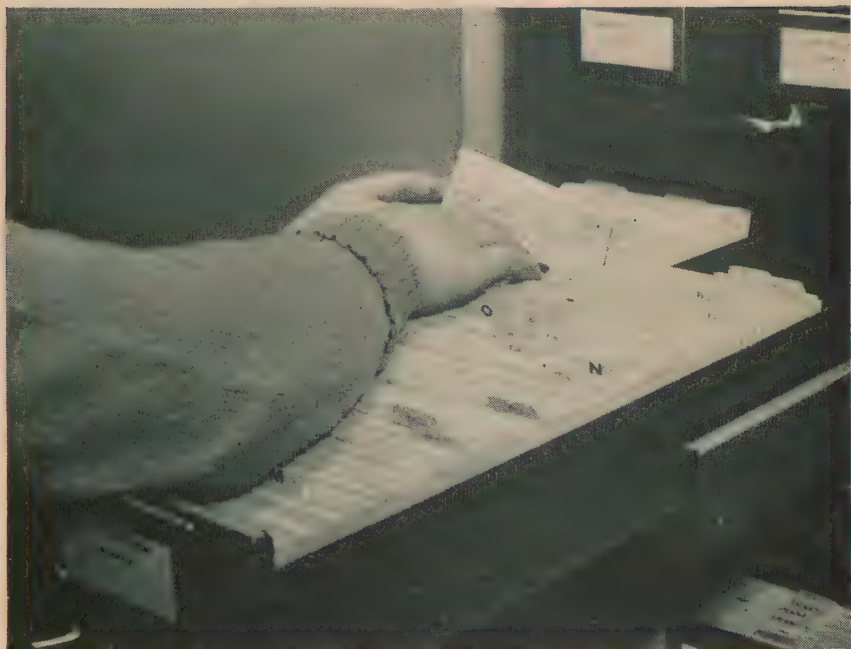
## Treatment Procedures in a Venereal Disease Clinic



A person entering one of the rapid treatment centers operated during the war in various States by the Venereal Disease Division of the Public Health Service. (The persons shown acting as patients in the following photographs consented to be models for this series. They do not have a venereal disease.)



Before admission to a rapid treatment center, all patients are registered and given an admission card.



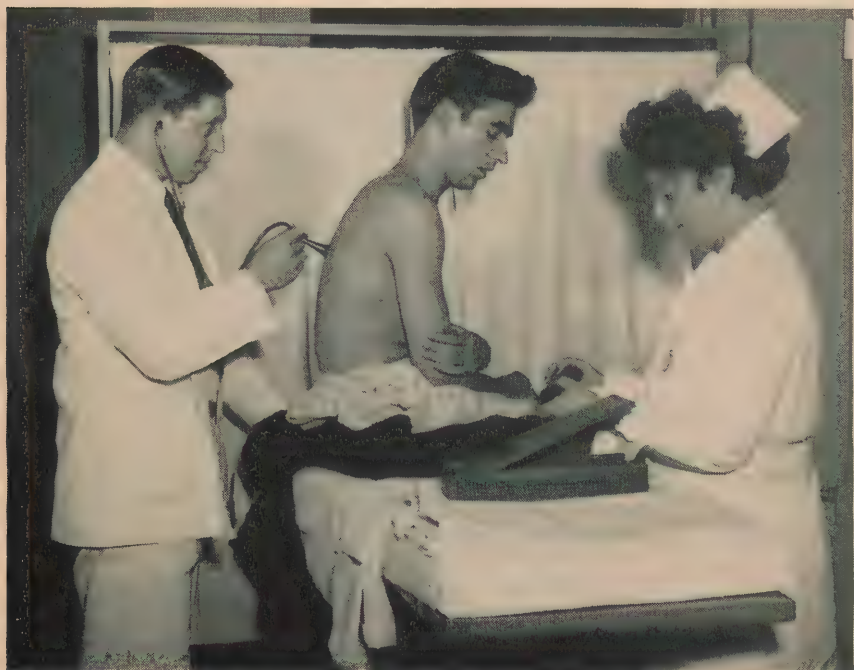
A restricted file is maintained on each patient so that the center may notify him when to return for his posttreatment follow-up examinations.



A blood sample is taken from each entering patient by the clinic nurse.



On each blood sample taken, the staff of the center performs a qualitative Kahn test to determine whether or not syphilis is present; when evidence of the disease is found, a quantitative Kahn test is used to determine degree of infection.



A complete physical examination is given privately to each patient by one of the center's staff physicians.



A contact interviewer explains the importance of locating other persons who may have been exposed to venereal disease, thus opening the way for the patient to name any persons he knows who may have been exposed.



Penicillin is used for rapid treatment of syphilis; it is usually injected in the hip.

Meanwhile, in 1945, the Public Health Service had begun to apply to civilians the techniques of mass blood testing which had brought such excellent results in syphilis case finding among selectees at the height of the wartime mobilization program. In cooperation with medical societies and State and local health departments, the Service conducted a series of 45-day case finding demonstrations in various communities of the Nation. By means of intensive programs of public information and education, individual citizens were persuaded to appear voluntarily at designated stations either for physical examinations for venereal disease or for serologic tests for syphilis. Paid newspaper, radio, and billboard advertising, and motion-picture theaters, sound trucks, and other facilities were used to instruct the public on the prevalence, dangers, symptoms, and therapy of venereal diseases and to urge them to report for tests and, when indicated, for treatment. In several areas of the country, virtually the entire population of some cities and counties reported for examinations and tests. The first of this series of demonstrations was conducted in New Orleans, La. It resulted not only in the discovery and treatment of numerous cases of syphilis but also of 3,953 new cases of gonorrhea—more than the total number of cases of the latter reported in New Orleans during the two preceding years.

### **Control Operations in Industry**

It was recognized by venereal disease authorities, early in the progress of the wartime venereal disease control program, that, since more than 40 percent of the Nation's population was included in its labor force, efforts to reduce the venereal disease ratio among industrial workers should have a favorable influence on incidence of venereal disease in the entire population. In 1942, consequently, the Surgeon General of the Public Health Service appointed an Advisory Committee on the Control of Venereal Disease in Industry. The committee was composed of physicians representing the medical profession, the Public Health Service, industrial concerns, the American Social Hygiene Association, and other interested organizations and agencies. It issued a report, on August 10, 1942, embodying its recommendations to State and local health departments for a venereal disease control program in industry. Specific goals of the control program recommended by the committee were:

- (1) Discovery and treatment of venereal disease and prevention of its spread among industrial workers and their contacts;
- (2) Development of employment policies—fair to both employer and employee—which would assure maximum use of available manpower;
- (3) Coordination of industrial venereal disease control programs with those being conducted by the community as a whole.

If these goals were achieved, the report pointed out, both management and labor would benefit from the better state of health which would result among members of the labor force. Dividends would accrue to management in the form of increased labor efficiency and higher productivity as well as lower rates of labor turn-over, absenteeism, and disability compensation payments, while labor would benefit in terms of higher earning power. The report also emphasized that it should not be the policy of industry to discharge or to refuse to employ individuals who, upon examination, are found to have syphilis or gonorrhea, provided such individuals take immediate steps to obtain proper treatment.

In 1945, the American Social Hygiene Association stepped up its efforts to assist State and local health officers, industrial concerns, and labor and management groups in establishing venereal disease control programs in industry. Both the Industrial Hygiene and Venereal Disease Divisions of the Public Health Service cooperated with the Association in conducting these activities. By 1946, the principles of control recommended by the Surgeon General's Advisory Committee had been endorsed by the Association of State and Territorial Health Officers, leading labor unions, many industrial organizations, chambers of commerce, and industrial and trade associations, and active control programs in industry were being carried out in almost every State in the country.

### **Procedures for Treating Veterans**

As the war drew to its close in 1945, the problem of controlling the spread of venereal infection from demobilized military and naval personnel who had contracted syphilis while in uniform began to assume serious proportions. Again the Public Health Service cooperated with the Army, Navy, and Coast Guard in organizing a program of blood tests for all military and naval personnel upon their separation from service. Arrangements were made whereby all separated personnel whose serologic tests for syphilis were positive were referred to appropriate rapid treatment centers or to State or local health departments for follow-up observation. During the period of most rapid demobilization, the Public Health Service provided personnel at all Army separation centers to interview separated soldiers with positive or doubtful results in their serologic tests and refer them to the nearest rapid treatment center; the interviewers also saw to it that, when necessary, transportation to the center was provided.

That the original "Eight-Point Agreement" for combating venereal disease drawn up in 1940 by the Army, Navy, Public Health Service, and various voluntary agencies was considered to have proved its value by the end of the war is indicated by the fact that its essential pro-

visions were reaffirmed in 1946 by all groups which had originally participated in formulating it.

### International Cooperation

International cooperation in venereal disease control activities continued to take place during the war years, although it was not carried out on as wide a scale as during prewar years. It consisted largely of exchange of information among nations regarding the source and spread of venereal infections.

In North America, Canada and the United States exchanged epidemiologic data on venereal disease on a systematic basis. The United States also worked closely with the Mexican Government, through the United States-Mexico Border Public Health Association, on a venereal disease control program. The United States also exchanged epidemiologic data with other Western Hemisphere countries, and most of the American republics participated actively in cooperative venereal disease control efforts through the Pan American Sanitary Bureau and the American Social Hygiene Association.

Some medical information on venereal disease as well as epidemiologic data was exchanged among health officials of various nations. The Venereal Disease Division of the Public Health Service, for example, made freely available to physicians and health agencies of other countries information regarding new treatment methods perfected in the United States.

In addition, international cooperation in venereal disease control was exemplified by the cooperative control program carried out by Great Britain and the United States among military and naval personnel of the two nations stationed at bases in the Caribbean area.<sup>17</sup>

The National Conference on Postwar Venereal Disease Control, held in St. Louis, Mo., in November 1944, under the auspices of the Venereal Disease Division of the Public Health Service, was attended by delegates from many nations. The increasing need for closer international cooperation in venereal disease control activities was heavily accented during the conference.

As a result of the control activities undertaken by the Venereal Disease Division and the cooperative efforts of numerous State, local, and voluntary health agencies, the spread of venereal infection in the United States was kept at a minimum during the war years.

### *Disposal of Surplus Property*

The Office of Surplus Property Utilization was established in July 1945 in the States Relations Division of the Public Health Service. Its

---

<sup>17</sup> This aspect of the venereal disease control program is described on pp. 58-59.

main function was to assist in administering that part of the Surplus Property Act of 1944 which permitted transfers of war surplus materials to State and local health agencies at prices lower than those which other classes of buyers were required to pay.

Through this Office, measures were initiated for the transfer of certain military and naval hospitals and camps to State or local health agencies desiring these properties for use as general or special hospitals. A large number of such properties had been allocated for this purpose by the time the Office was discontinued, late in 1946.

### *Employment Counseling*

To relieve war-aggravated public health personnel shortages that still existed after July 1, 1945, the American Public Health Association set up a Counseling and Employment Service toward the end of 1945. Personnel discharged from the armed forces who had been trained in various phases of public health work were approached by the American Public Health Association to fill positions in communities with shortages. The Public Health Service cooperated in this project by paying the salary of the chief of the Counseling and Employment Service.

## Summary

The emergency measures which have been outlined above, carried on through State and local health departments in areas of critical importance to the national war effort, helped to keep the health balance in the United States stable during the war years in the face of widespread migrations of population, both civilian and military. Statistical evidence of this fact can be obtained by an examination of the case rate per 100,000 population of certain normally prevalent communicable diseases during the calendar years 1941-44. Such a study would indicate that the incidence of more than half of these diseases declined during this period. Among the others, increase in incidence was small. This record of disease control was achieved despite the almost insuperable obstacles of overcrowding in towns, industrial speed-up, shortage of materials, and shortage of health personnel.

From fiscal year 1941 through fiscal year 1946, \$40,789,632 was spent by the Public Health Service for emergency health and sanitation activities throughout the country. In addition, \$64,105,000 was spent by the Venereal Disease Division of the Service on control activities during the same period.<sup>18</sup> It is evident that the activities on which this money was expended, by helping to maintain favorable health standards in the United States during a period when maintenance of such standards was vital, were a factor of some weight in the military victory of the United Nations.

After the expiration of the last emergency health and sanitation appropriation, on June 30, 1946, some of the health activities undertaken by the Public Health Service during the period of emergency were continued and even expanded under nonemergency laws and appropriation acts. The Hospital Facilities Section of the States Relations Division developed into the Hospital Facilities Division of the Service, and is now continuing its hospital planning and construction activity under authority of the Hospital Survey and Construction Act.

The Sanitary Engineering Division is assisting States and local communities in carrying out milk and food sanitation activities on a much wider scale than before the war. The Office of Malaria Control in War Areas has been absorbed by the Service's new Communicable Disease Center, which is continuing to apply and perfect techniques

---

<sup>18</sup> Excluding the \$15,878,082 allocated to States and communities by the Division and the Federal Works Agency during the period 1944-46 for construction, operation, and maintenance of rapid treatment centers.

of typhus control, malaria control, and *Aedes aegypti* mosquito control which were initiated during the war period. A training program, designed to give health workers in State and local health departments as well as in the Public Health Service a better understanding of their work, has also been undertaken recently by the Center. This program, too, is an outgrowth of a war activity of the Service—the orientation courses given originally to emergency health and sanitation personnel. The peacetime activities of the Industrial Hygiene and Tuberculosis Control Divisions have also been extended considerably as a result of their war experiences. Since attaining divisional status, the latter has been receiving regularly substantial appropriations which it employs in research activities and for grants to States for tuberculosis control.

In many cases, health and sanitation procedures begun in local areas during the war under the aegis of the Public Health Service have been continued independently by State and local health departments themselves in the postwar period.

The emergency health and sanitation activities carried on by the Public Health Service in extracantonment areas and, in particular, the work of its liaison officers to the Army, were highly commended by Brig. Gen. James S. Simmons of the Medical Department of the Army in the following letter written to Surg. Gen. Thomas Parran in September 1944:

Yesterday, at a meeting held in the Office of the Surgeon General of the Army, and attended by the surgeons of the nine Service Commands in this country, I asked these gentlemen for an expression of their opinions concerning the present usefulness of the program of extramilitary sanitation and disease control which the Public Health Service has been carrying on in cooperation with the Army since 1940. I also inquired as to the effectiveness of the arrangement which was established at that time for the assignment to each Service Command Office of a liaison officer from the Public Health Service to help in coordinating the program.

I feel that you will be interested to know that these two questions brought out an uniformly enthusiastic endorsement of the effectiveness of the program and of the great value to the Service Command surgeons of their Public Health Service liaison officers. Many of the surgeons stated strongly that they could not perform the functions of coordination with civilian authorities effectively without such liaison officers.

I was pleased to have this enthusiastic evidence of the fact that our co-operative arrangement of 1940 is still working out as effectively as it has in all the previous years of its existence.

This letter was only one more piece of evidence attesting to the fact—generally recognized by both military and civilian officials as the war progressed—that the emergency health and sanitation program filled the chinks in the country's protective armor against disease and, by so doing, was of invaluable assistance to the national war effort.

## Appendix A

### *Emergency Health and Sanitation Sections of Appropriation Acts*

*Urgent Deficiency Appropriation Act, 1941.* (55 Stat. 14.) Independent Agencies, Federal Security Agency.

"Public Health Service, emergency health and sanitation activities, 1941: For all expenses necessary to enable the Surgeon General of the Public Health Service to assist State and local health authorities in health and sanitation activities (1) in areas adjoining military and naval reservations, (2) in areas where there are concentrations of military and naval forces, (3) in areas adjoining Government and private industrial plants engaged in defense work, and (4) in private industrial plants engaged in defense work; and to provide emergency health and sanitation services in Government industrial plants engaged in defense work and in areas adjoining United States military and naval reservations outside of the United States; such expenses to include personal services in the District of Columbia and elsewhere; purchase, exchange, maintenance, and operation of passenger-carrying automobiles; stationery, travel; printing and binding; and items otherwise properly chargeable to the appropriation for miscellaneous and contingent expenses of the Public Health Service, fiscal year 1941, \$525,000."

*Labor-Federal Security Appropriation Act, 1942.* (55 Stat. 466.) Title II—Federal Security Agency. Public Health Service.

"Emergency health and sanitation activities (national defense): For all expenses necessary to enable the Surgeon General of the Public Health Service to assist State and local health authorities in health and sanitation activities (1) in areas adjoining military and naval reservations, (2) in areas where there are concentrations of military and naval forces, (3) in areas adjoining Government and private industrial plants engaged in defense work and in areas adjoining United States military and naval reservations outside of the U. S., such expenses to include personal services in the District of Columbia and elsewhere, purchase, exchange, maintenance, and operation of passenger-carrying automobiles, stationery, travel, printing and binding, and items otherwise properly chargeable to the appropriation for miscellaneous and contingent expenses of the Public Health Service \$1,235,000."

*Second Deficiency Appropriation Act, 1941.* (55 Stat. 541.) Title I—General Appropriations. Federal Security Agency. Public Health Service.

"Emergency health and sanitation activities (national defense), Public Health Service: For an additional amount for emergency health and sanitation activi-

ties (national defense), fiscal year 1942, including the same objects specified under this head in the Federal Security Agency Appropriation Act, 1942, \$1,940,000.

"Not to exceed \$31,580 of the amount appropriated for 'Emergency health and sanitation activities (national defense), Public Health Service, 1942' in the Federal Security Agency Appropriation Act, 1942, may be transferred to the appropriation 'Commissioned officers, pay, and so forth, Public Health Service', and the limitation on the number of regular active commissioned officers is hereby increased by ten."

*First Deficiency Appropriation Act, 1942.* (56 Stat. 98.) Title I—  
General Appropriations. Federal Security Agency. Public  
Health Service.

"Emergency health and sanitation activities, Public Health Service (national defense): For an additional amount for emergency health and sanitation activities (national defense), fiscal year 1942, including the objects specified under this head in the Federal Security Agency Appropriation Act, 1942, and the Surgeon General is authorized to engage in such activities in the areas specified in said Act independently of the State and local authorities, \$1,295,000."

*Labor-Federal Security Appropriation Act, 1943.* (56 Stat. 562.)  
Title II—Federal Security Agency. Public Health Service.

"Emergency health and sanitation activities (national defense): For all expenses necessary to enable the Surgeon General of the Public Health Service to conduct independently or to assist State and local health authorities in health and sanitation activities (1) in areas adjoining military and naval reservations, (2) in areas where there are concentrations of military and naval forces, (3) in areas adjoining Government and private industrial plants engaged in defense work, and (4) in private industrial plants engaged in defense work, and to provide emergency health and sanitation services in Government industrial plants engaged in defense work and in areas adjoining United States military and naval reservations outside of the United States, and not to exceed \$420,000 to enable the Surgeon General without regard to section 3709 of the Revised Statutes, either independently or, subject to regulations promulgated by him, by grants to public and private hospitals, to procure and to establish reserves of liquid, frozen or dry blood plasma or serum albumin for the treatment of casualties resulting from enemy action, such expenses to include personal services in the District of Columbia and elsewhere, purchase, exchange, maintenance, and operation of passenger-carrying automobiles, stationery, travel, printing and binding, and items otherwise properly chargeable to the appropriation for miscellaneous and contingent expenses of the Public Health Service, \$8,984,000 of which not to exceed \$53,686 may be transferred to the appropriation 'Pay, and so forth, commissioned officers, Public Health Service'."

*First Deficiency Appropriation Act, 1943.* (57 Stat. 21.) Title I—  
General Appropriations. Independent Agencies.

"Emergency health and sanitation activities (national defense): For an additional amount for emergency health and sanitation activities (national defense), fiscal year 1943, under this head in the Federal Security Agency Appropriation

Act, 1943, \$438,500; and the limitation upon the amount which may be expended for the procurement and establishment of reserves of blood plasma or serum albumin is hereby increased from \$420,000 to \$499,500."

*Urgent Deficiency Appropriation Act, 1943.* (57 Stat. 431.) Title II—War Overtime Pay and Other Compensation Increases. Federal Security Agency.

"Emergency health and sanitation activities, Public Health Service (national defense), \$289,700."

*Labor-Federal Security Appropriation Act, 1944.* (57 Stat. 494.) Title II—Federal Security Agency. Public Health Service.

"Emergency health and sanitation activities (national defense): For all expenses necessary to enable the Surgeon General of the Public Health Service to conduct independently or to assist State and local health authorities in health and sanitation activities, (1) in areas adjoining military and naval reservations, (2) in areas where there are concentrations of military and naval forces, (3) in areas adjoining Government and private industrial plants engaged in defense work, and (4) in private industrial plants engaged in defense work, to provide emergency health and sanitation services in Government industrial plants engaged in defense work and in areas adjoining United States military and naval reservations outside the United States, and to perform the functions of the Public Health Service under the facility security program authorized by Executive Order Numbered 9165; such expenses to include personal services in the District of Columbia and elsewhere, maintenance and operation of passenger-carrying automobiles, stationery, travel, printing and binding, the purchase of oils, larvicides, and other diluents without regard to section 3709 of the Revised Statutes, and items otherwise properly chargeable to the appropriation for miscellaneous and contingent expenses of the Public Health Service, \$9,729,000, of which not to exceed \$53,686 may be transferred to the appropriation 'Pay and so forth, commissioned officers, Public Health Service'."

*First Supplemental National Defense Appropriation Act, 1944.* (57 Stat. 611.) Federal Security Agency. Public Health Service.

"Emergency health and sanitation: For an additional amount for 'Emergency health and sanitation activities (national defense)' fiscal year 1944, including the objects specified under this head in the Federal Security Appropriation Act, 1944, \$1,550,000: Provided, That the Surgeon General is authorized, on application of a municipality, county or other local subdivision of government duly approved by the State health department having jurisdiction over said municipality, county, or other local subdivision of government to enter into agreements with private practicing physicians and dentists under which, in consideration of the payment to them of a relocation allowance of not to exceed \$250 per month for three months and the actual cost of travel and transportation of the physician or dentist and his family and household effects to the new location, such physician or dentist will agree to move to and engage in the practice of his profession in such area for a period of not less than one year: Provided, however, that no such contract shall be made with any physician or dentist unless such physician or dentist shall be admitted to practice by the State authority having jurisdiction

of such new location: Provided further, that each such applicant subdivision shall contribute 25 per centum to the total cost of such relocation allowance, travel, and transportation costs of each such physician or dentist, and his family obtained by said applicant."

*First Deficiency Appropriation Act, 1944.* (58 Stat. 150.) Title II—  
War Overtime Pay and Other Compensation Increases. Federal  
Security Agency.

"Emergency health and sanitation activities, Public Health Service (national defense), 1944, \$400,000."

*Joint Resolution, Authorizing the disposal of certain blood plasma reserves.* (58 Stat. 853.)

"\* \* \* Resolved, \* \* \* That so much of the reserves of liquid, frozen, or dry-blood plasma or serum albumin established from funds appropriated under the heading 'Emergency funds for the President' in the Independent Offices Appropriation Act, 1942 or from funds appropriated for emergency health and sanitation activities (national defense) under the heading 'Public Health Service' in the Labor-Federal Security Appropriations Act, 1943, and required by law to be held in reserve for casualties resulting from enemy action as the Surgeon General of the Public Health Service determines are no longer needed for the purpose for which established or are likely to become ineffective prior to use if kept in reserve, may be disposed of by such Surgeon General by transfer or release to Federal, State, or local public-health authorities or to Federal or other public or nonprofit hospitals. Provided, That any cost incidental to such transfer shall be borne by the transferee."

*Labor-Federal Security Appropriation Act, 1945.* (58 Stat. 547.)  
Title II—Federal Security Agency. Public Health Service.

"Emergency health and sanitation activities (national defense): For all expenses necessary to enable the Surgeon General of the Public Health Service to conduct independently or to assist State and local health authorities in health and sanitation activities (1) in areas adjoining military and naval reservations, (2) in areas where there are concentrations of military and naval forces, (3) in areas adjoining Government and private industrial plants engaged in defense work, and (4) in private industrial plants engaged in defense work, and to provide emergency health and sanitation services in Government industrial plants engaged in defense work and in areas adjoining United States military and naval reservations outside the United States; such expenses to include personal services in the District of Columbia and elsewhere, the acquisition by transfer from the War Department of not to exceed two hundred and fifty general-purpose automotive vehicles to be paid for by transfer of funds, maintenance and operation of passenger-carrying automobiles, stationery, travel, printing and binding, the purchase of oils, larvicides, and other diluents without regard to section 3,709 of the Revised Statutes, purchase of reprints from State, city and private publications and items otherwise properly chargeable to the appropriation for miscellaneous and contingent expenses of the Public Health Service \$11,250,000 of which not to exceed \$53,686 may be transferred to the appropriation 'Pay and so forth, commissioned officers, Public Health Service'."

*First Supplemental Appropriation Act, 1945.* (58 Stat. 853.) Title I—General Appropriations. Federal Security Agency. Public Health Service.

“Emergency health and sanitation activities (national defense): For an additional amount for emergency health and sanitation activities (national defense), fiscal year 1945, including the objects specified under this head in the Federal Security Agency Appropriation Act, 1945, and including the purchase of thirty passenger automobiles, and the aforesaid appropriation together with the amount appropriated herein shall be available for the control of malaria and diseases of tropical origin pursuant to section 311 of the Act of July 1, 1944 (Public Law 410), and the development and prosecution of a program for the control of communicable diseases in Liberia in cooperation with the Liberian Government, \$1,875,000.”

*Labor-Federal Security Appropriation Act, 1945.* (59 Stat. 361.) Title II—Federal Security Agency. Public Health Service.

“Health and sanitation activities, war and defense areas (national defense): To carry out the purposes of section 604 of the Act, and the development and prosecution of a program for control of communicable diseases, including travel: printing and binding; the purchase of twenty-five passenger automobiles; and the purchase of oils, larvicides, and diluents without regard to section 3709 of the Revised Statutes: \$2,615,000.”

*Joint Resolution, Reducing certain appropriations available in the fiscal year ending June 30, 1945.* (59 Stat. 407.)

“\* \* \* Resolved \* \* \* That the appropriations of the departments and agencies \* \* \* are hereby reduced in the sums hereinafter set forth \* \* \*: Federal Security Agency \* \* \* Public Health Service: Emergency health and sanitation activities (national defense), \$800,000 \* \* \*”

*First Supplemental Surplus Appropriation Rescission Act, 1946.* (60 Stat. 6.) Title I—Executive Office of the President, Independent Offices, and Executive Departments. Federal Security Agency.

(Appropriations available in fiscal year 1946 reduced:) “Public Health Service: Health and sanitation activities, war and defense areas (national defense), \$329,568.”

*Second Supplemental Surplus Appropriation Rescission Act, 1946.* (60 Stat. 221.) Title I—Executive Office of the President, Independent Offices, and Executive Departments. Federal Security Agency.

(Appropriations available in fiscal year 1946 reduced:) “Public Health Service: Health and sanitation activities, war and defense areas (national defense), \$125,000.”

## Appendix B

### *Appropriations and Expenditures for Emergency Health and Sanitation Activities*

#### FISCAL YEAR 1941<sup>1</sup>

Total appropriation.....	\$525, 000
Expenditures:	
General emergency health and sanitation.....	\$416, 966
Industrial hygiene in industrial plants and War and Navy munitions plants.....	100, 496
Net total expenditures.....	517, 462
Estimated savings and unobligated balance.....	7, 538

#### FISCAL YEAR 1942

Total appropriation.....	\$4, 470, 000
Expenditures:	
Assistance to State and local health activities.....	\$1, 630, 243
Malaria Control in War Areas.....	1, 742, 776
Industrial hygiene in industrial plants and War and Navy munitions plants.....	487, 018
Establishment and maintenance of reservoirs of blood and blood derivatives.....	292, 372
Total.....	4, 152, 409
Transferred to pay, etc., commissioned officers, United States Public Health Service.....	31, 580
Grand total.....	4, 183, 989
Other receipts:	
By transfer, from President's emergency fund.....	292, 500
Net total expenditures.....	3, 891, 489
Estimated savings and unobligated balance.....	196, 738

<sup>1</sup> From March 1 to June 30, 1941, only.

## FISCAL YEAR 1943

Total appropriation.....	\$9,702,200
Expenditures:	
Administration.....	\$584,633
<i>Aedes aegypti</i> mosquito control.....	73,000
Assistance to States.....	1,093,355
Community facilities service.....	26,324
Cooperation with other Government agencies.....	19,319
Emergency medical care.....	4,129
Facilities security.....	4,738
Health and sanitation services, Pan Am. Highway..	17,903
Industrial hygiene.....	360,285
Laboratory services in local areas.....	68,260
Malaria Control in War Areas.....	6,029,403
Milk and food sanitation.....	41,289
Tuberculosis control.....	201,429
Establishment and maintenance of reservoirs of blood and blood derivatives.....	499,059
Total .....	9,023,126
Transfers:	
To preventing spread of epidemic diseases.....	\$168,000
To pay, etc., commissioned officers....	53,686
To travel expenses, Federal Security Agency.....	70,500
To National Institute of Health.....	163,940
To printing and binding, Federal Se- curity Agency.....	5,000
To public health education.....	46,820
Total.....	507,946
Grand total.....	9,531,072
Other receipts:	
Reimbursement for services performed.....	25,610
Net total expenditures.....	9,505,462
Estimated savings and unobligated balance.....	196,738

## FISCAL YEAR 1944

Total appropriation .....	\$11,679,000
Expenditures:	
Administration.....	\$816,065
Tuberculosis control.....	264,019
<i>Aedes aegypti</i> mosquito control.....	377,642
Assistance to States.....	999,486
Cooperation with other Government agencies.....	152,168
Community facilities.....	55,700
Emergency medical care.....	7,290
Facilities security.....	72,365
Health and sanitation services, Pan Am. Highway...	39,466
Health education.....	93,767
Industrial hygiene.....	602,676
Laboratory services in local areas.....	101,501
Malaria control.....	6,880,575
Milk and food sanitation.....	105,043
Pay of commissioned officers.....	77,563
Venereal disease control, Caribbean area.....	101,911
Uniform allowance.....	100,000
Total.....	10,847,237
Other receipts:	
Reimbursement for services performed.....	114,038
From war contribution fund, Treasury Department...	55,700
Total.....	169,738
Net total expenditures.....	10,677,499
Estimated savings and unobligated balance.....	1,001,501

FISCAL YEAR 1945 <sup>2</sup>

Funds allocated:	
Administration.....	\$757,613
Assistance to States.....	1,024,481
Community facilities.....	39,374
Industrial hygiene:	
Research.....	\$240,000
Investigations.....	407,775
Total.....	647,775
Milk and food sanitation.....	113,912
Mission to Liberia.....	235,000
Special plague control in Hawaii.....	78,698
Tuberculosis control.....	272,045
Venereal disease control, Trinidad.....	47,954
Malaria control.....	8,653,182
Total.....	\$11,870,034
Transfers received from:	
Division of Public Health Methods.....	132,780
Sanitary Engineering Division.....	266,000
Commissioned officers' pay.....	53,686
Division of Physiology.....	2,500
Total.....	454,966
Grand total, funds allocated and transferred.....	12,325,000

<sup>2</sup> Title changed to "Health and Sanitation" in 1945.

## FISCAL YEAR 1946

## Funds allocated :

Administration-----	\$514, 208
---------------------	------------

Assistance to States-----	533, 558
---------------------------	----------

## Industrial hygiene :

Research-----	\$175, 582
---------------	------------

Investigations-----	254, 226
---------------------	----------

Total-----	429, 808
------------	----------

Special plague control in Hawaii-----	34, 745
---------------------------------------	---------

Milk and food sanitation-----	88, 183
-------------------------------	---------

Mission to Liberia-----	312, 837
-------------------------	----------

Total -----	\$1, 913, 339
-------------	---------------

## Transfers received from :

Sanitary Engineering Division-----	119, 598
------------------------------------	----------

Division of Public Health Methods-----	61, 902
--	---------

National Institute of Health-----	2, 593
-----------------------------------	--------

Total-----	184, 093
------------	----------

Grand total, funds allocated and transferred-----	2, 097, 432
---	-------------

# Appendix C

## Assignments of Emergency Health and Sanitation Personnel

Table 1. Number of assignments and months served by professional personnel under the emergency health and sanitation program in State and local health departments according to class of employee and place of service

State, Territory or country	Number of assignments and months served for each class of employee																	
	Physi- cian		Dentist		Engineer		Nurse		Sanitar- ian		Health educa- tion con- sultant		Bacteri- ologist		Labora- tory and medical techni- cian		Chemist	
	Assignments	Months	Assignments	Months	Assignments	Months	Assignments	Months	Assignments	Months	Assignments	Months	Assignments	Months	Assignments	Months	Assignments	Months
All.....	374	3,539	8	73	293	2,674	276	2,807	82	1,232	8	85	27	319	20	241	17	356
Alabama.....	19	104	2	1	10	68	6	29					2	13				
Arizona.....	1	21					4	43					3	13	1	2		
Arkansas.....	11	104			8	63	10	156	1			24	1	1				
California.....	7	44			6	59	6	101	1			15	2	66				
Colorado.....					1	11	2	18										
Connecticut.....	3	39			2	83	2	25	1	22			1	3			1	35
Delaware.....	6	58					2											
District of Columbia.....	8	22	1	9	8	45	10	15	2	10	1	16			1	1		
Florida.....	13	69			14	102	8	73	2	39			1	5				
Georgia.....	9	85			5	28	7	39	7	125								
Idaho.....	1	25			1		2	51										
Illinois.....	10	84			8	10	7	48	3	52								
Indiana.....	6	60			6	36	7	74										
Iowa.....	4	55			2	46	2	52	2	65								
Kansas.....	10	118			9	53	7	131	1	9			2	14				
Kentucky.....	14	168			4	24	9	73	2	18					1	9		
Louisiana <sup>2</sup> .....	8	39			7	36	16	69	2	30			4	50			3	35
Maine.....	1	38			1	8												
Maryland.....	18	86			8	157	6	43	7	78	2	15			2	21	1	
Massachusetts.....	5	49	1	12	22	182			2	29								
Michigan.....	8	74	2	21			11	99	3	33					1	11	1	39
Minnesota.....					2	48												
Mississippi.....	14	166			8	112	4	50	2	68			1	16	1			
Missouri.....	28	248			7	75	13	134	3	26			2	17				
Montana.....									1	31								
Nebraska.....	4	40			3	35	9	91	1	10					1	24		
Nevada.....	2	7			2	13	2	46										
North Carolina <sup>2</sup> .....	21	178			18	121	18	81	5	41	1	20	1	39			1	37
New Hampshire.....	3	35			1	55							1	10				
New Jersey.....	5	56			4	51	4	82	1	9			1	20	1	13		
New Mexico.....	1	4																
New York.....	13	182			15	179	14	121	3	45							1	42
Ohio.....	4	39			13	119			7	75			1	14			5	100
Oklahoma.....	12	110			5	55	15	209	1	31								
Oregon.....	6	81			2	44	7	50	2	33								

<sup>1</sup> Exclusive of time spent in taking orientation courses, and in assignments to the headquarters of the Public Health Service, in Washington, D. C., the district offices of the Service, the Office of Malaria Control in War Areas, and on loan to other Federal agencies.

<sup>2</sup> In addition, 1 milk specialist was assigned to Louisiana for 23 months, and 1 milk specialist was assigned to North Carolina for an undetermined number of months.

Table 1—Continued

State, Territory or country	Number of assignments and months served for each class of employee																	
	Physi- cian		Dentist		Engineer		Nurse		Sanitar- ian		Health educa- tion con- sultant		Bacteri- ologist		Labora- tory and medical techni- cian		Chemist	
	Assignments	Months	Assignments	Months	Assignments	Months	Assignments	Months	Assignments	Months	Assignments	Months	Assignments	Months	Assignments	Months	Assignments	Months
Pennsylvania	1				3	4					1	11						
Rhode Island					2	12												
South Carolina	8	81			13	94	5	57	2	58								
South Dakota	6	75			1	26	1	10	2	42			2	10				
Tennessee	16	177	1	11	5	33	6	97	3	36			1	19	1	5	1	2
Texas	12	91			18	190	7	79							2	24	1	11
Utah	1	2							1	11								
Virginia	22	208			15	144	18	310	4	96					6	106	1	15
Vermont							1	4										
Washington	17	210			6	59	9	77	2	16	1	1			1	16	1	40
West Virginia	5	104			7	56	2	20	1	7								
Wisconsin	1	20					1	5										
Wyoming							1	3										
Alaska	1	7			1	6	3	36					1	9	1	9		
Hawaii							6	30										
Puerto Rico					1	1												
British West Indies	1	16					1	15			2	22						
Guatemala	1				4	14			1	5								
Nicaragua	1																	
Panama					3	16			1	3								
Mexico					1	5												
Canada					1	5												
Peru					1													
England	1	18																
Germany	1	3																
Liberia	4	39	1	19	2	22	4	51	2	31								
Africa <sup>a</sup>							1	10	1	9								

<sup>a</sup> Exclusive of Liberia.

Table 2. Duration of assignments (in months) for professional personnel paid from emergency health and sanitation funds, by type of assignment and employee classification

Class of employee	Number of months employed by type of assignment									
	All months	Gen- eral health	Con- trol of vene- real disease	Con- trol of tuber- culosis	Indus- trial hy- giene	Sani- tation sur- veys	Ty- phus control	Flood control	Stream pollu- tion control	Other and un- known
All months.....	20, 655	14, 055	74	64	2, 625	93	60	136	106	3, 442
Physician.....	6, 043	4, 719	18	37	589	---	---	6	---	674
Engineer.....	5, 832	3, 238	---	---	1, 029	3	---	125	---	1, 437
Nurse.....	4, 653	4, 134	41	---	92	---	---	---	---	386
Sanitarian.....	2, 129	985	---	---	564	90	60	5	19	406
Health education consultant.....	96	28	15	---	---	---	---	---	---	53
Bacteriologist.....	570	329	---	---	---	---	---	---	14	227
Laboratory or med- ical technician.....	529	387	---	27	11	---	---	---	---	104
Milk specialist.....	145	56	---	---	---	---	---	---	---	89
Chemist.....	472	88	---	---	283	---	---	---	73	28
Dentist.....	186	91	---	---	57	---	---	---	---	38

# Appendix D

## Statistical Data, Office of Malaria Control in War Areas

Tabular Summary: *Number of operations by type, number of war areas and establishments protected, number of employees and man-hours worked, and pay roll expenditures, fiscal years 1943-46, Office of Malaria Control in War Areas*

Type of operation	Totals	Fiscal years			
		1943 <sup>1</sup>	1944	1945	1946 <sup>2</sup>
Residual spraying:					
Number of houses sprayed.....	649,069			264,482	384,587
Number of pounds DDT used.....	294,953			103,957	190,996
Larviciding:					
Number of gallons of oil used.....	5,693,858	1,878,151	1,527,008	1,387,726	900,973
Number of pounds paris green used.....	729,710	305,987	155,735	151,659	116,329
Number of surface acres treated with insecticides.....	660,486	174,901	210,198	161,397	113,990
Number of acres cleared.....	37,437	12,802	8,036	13,142	3,457
Number of linear feet of surface cleaned <sup>3</sup> .....	103,703,360	28,534,882	28,813,536	39,085,224	7,209,718
Number of linear feet of ditching constructed <sup>4</sup> .....	10,898,484	642,632	6,092,803	3,588,372	574,677
Number of cubic feet earth fill used.....	315,738	54,704	79,230	123,776	58,028
Number of acres of water surface eliminated.....	13,503	2,913	6,879	3,293	418
Number of areas of operation, end of fiscal year.....		144	153	169	91
Number of men employed, end of fiscal year.....		3,704	<sup>5</sup> 3,192	4,212	2,075
Number of man-hours worked per fiscal year.....	19,513,894	6,238,970	5,632,288	5,127,861	2,514,775
Number of war establishments being protected, end of fiscal year.....		1,143	1,298	2,065	2,065
Total pay roll per fiscal year.....	\$18,984,913	\$4,825,550	\$5,201,180	\$5,629,701	\$3,328,482

<sup>1</sup> Data insufficient for fiscal year 1942.

<sup>2</sup> For the 6 months ending Dec. 31, 1945, only.

<sup>3</sup> Includes minor drainage and ditching operations.

<sup>4</sup> Does not include minor drainage and ditching operations included under footnote 3.

<sup>5</sup> Average for April, May, and June 1944.

# Appendix E

## Program of Classes, Sixteenth Wartime Orientation Course Conducted by the Public Health Service, July 7 to August 3, 1944

FIRST  
WEEK

9:00 - 9:30	9:30 - 10:15	10:30 - 11:15	11:30 - 12:30	N O O N										1:30 - 2:00	2:00 - 2:45	3:00 - 3:45	4:00 - 5:00
FRIDAY July 7	INDUCTION AND REGISTRATION																
SATURDAY July 8	Wilson Hall - Nat. Inst. of Health																
	ROLL CALL AND INSTRUCTIONS TO CLASS Staff	WELCOME ADDRESS Dr. Parran	SERVICE, REGULATIONS AND COURTESIES Dr. Trautman	INDIVIDUAL CONFERENCES													
MONDAY July 10	HISTORY OF THE U. S. PUBLIC HEALTH SERVICE Dr. R. C. Williams	BUREAU OF MEDICAL SERVICES Dr. R. C. Williams	WORK OF THE HOSPITAL DIVISION Dr. Bean	ORGANIZATION OF THE U. S. PUBLIC HEALTH SERVICE Staff													
TUESDAY July 11	DIVISION OF COMMISSIONED OFFICERS Dr. Ossenfort	PERSONNEL PROCEDURES AND PRACTICES CIVIL SERVICE Mrs. Brake	TRAVEL Mr. Ardesser	LEAVE Mr. Marier	ACTIVITIES OF FOREIGN QUARANTINE DIVISION Dr. Dunahoo												
WEDNESDAY July 12	NATIONAL INSTITUTE OF HEALTH Dr. Dyer	RICKETTSIAL DISEASES Dr. Dyer	U. S. COAST GUARD Dr. Michel	WORK OF THE MENTAL HYGIENE DIVISION Dr. Kolb													
THURSDAY July 13	STRUCTURE AND FUNCTIONS OF A STATE HEALTH DEPARTMENT Director, Delamar Inst. of Public Health, N.Y.C.			VENEREAL DISEASE CONTROL Dr. Heller													
FRIDAY July 14	U. S. CADET NURSING CORPS Miss Petry	EPIDEMIOLOGICAL INVESTIGATIONS Dr. Gilliam		WORK OF DISTRICT OFFICE Dr. Sharp													
SATURDAY July 15	VIRUS DISEASES Dr. Armstrong	SMALLPOX Dr. Leake	CLINIC	LABORATORY ASPECTS V. D. CONTROL Dr. Mahoney													
				FOOD AND RESTAURANT SANITATION Mr. Miller													
				INTENSIVE TREATMENT METHODS FOR SYPHILIS Dr. Eagle													
				MILK SANITATION Mr. Andrews													
				INDIVIDUAL CONFERENCES													

M O V I N G				P I C T U R E S			
MEDICAL Dr. Burney				NURSING Miss Heisler			
VENEREAL DISEASE CONTROL Dr. Heller				ASSIGNMENT OF WAR AREA PROBLEMS Staff			
WORK OF DISTRICT OFFICE Dr. Sharp				PERSONNEL ADMINISTRATION Mr. Zimmerman			
LABORATORY ASPECTS V. D. CONTROL Dr. Mahoney				WORK OF THE LIAISON OFFICER Dr. Kratz			
FOOD AND RESTAURANT SANITATION Mr. Miller				INDIVIDUAL CONFERENCES			
INTENSIVE TREATMENT METHODS FOR SYPHILIS Dr. Eagle				INDIVIDUAL CONFERENCES			
MILK SANITATION Mr. Andrews				INDIVIDUAL CONFERENCES			

SECOND  
WEEK

9:00	9:30 - 10:15	10:30 - 11:15	11:30 - 12:30	1:30	2:00 - 2:45	3:00 - 3:45	4:00 - 5:00
MONDAY July 17	SANITARY ENGINEERING DIVISION Mr. Hoskins	WORK OF THE DENTAL DIVISION Dr. Wright	DIVISION OF PUBLIC HEALTH METHODS Mr. Perrott	NATIONAL NUTRITION PROGRAM Dr. Sebrell	OPERATION OF A LOCAL HEALTH DEPT. Com'r of Health Brunswick, Ga. Dr. M. E. Winchester	FIELD EXPERIENCES Dr. C. L. Williams, Jr.	TYPHUS FEVER CONTROL Mr. Borches
TUESDAY July 18	STATE HEALTH ADMINISTRATION Dr. I. C. Riggan, Va. State Health Com'r	MUNICIPAL - PUBLIC HEALTH ADMINISTRATION Health Officer Dist. of Col. Dr. Burney	THE AMERICAN PUBLIC HEALTH ASSOCIATION Dr. R. M. Atwater, Sec'y	MOVING PICTURES			
WEDNESDAY July 19	FIELD RELATIONS	COMMUNITY ORGANIZATION IN PUBLIC HEALTH Dr. Morgan	TROPICAL MEDICINE Dr. Thomas McGath, M.C., U.S.N.R.	TUBERCULOSIS CONTROL Dr. Milneboe			
THURSDAY July 20	CANCER CONTROL Dr. Spencer	MALARIA CONTROL IN WAR AREAS	MALARIA CONTROL IN WAR AREAS	PUBLIC HEALTH LAW Mr. Drexler	CONFERENCE	COMMUNICABLE DISEASE CONTROL PROCEDURES Dr. Gilliam	RAPID TREATMENT CENTERS Dr. Anderson
FRIDAY July 21				MALARIA CONTROL IN WAR AREAS			
SATURDAY July 22				MALARIA CONTROL IN WAR AREAS			

THIRD WEEK		REVIEW PERIOD				MOVING PICTURES				MOVING PICTURES					
9:00	9:30	9:30 - 10:15	10:30 - 11:15	11:30 - 12:30	1:30 - 2:00	2:00 - 2:45	3:00 - 3:45	4:00 - 5:00							
MONDAY July 24	9:30	NURSING IN WARTIME Miss McIver	CASE FINDING Miss Crain	PATIENT INTERVIEWS Mr. Tisdale	RURAL SANITATION Mr. Atkins	MOVING PICTURES				PUBLIC SPEAKING Dr. Derryberry	INDIVIDUAL CONFERENCE				
TUESDAY July 25	INDUSTRIAL HYGIENE Dr. Townsend					MOVING PICTURES				INDUSTRIAL HYGIENE Mr. Bloomfield					
WEDNESDAY July 26	INDIVIDUAL CONFERENCES		UNITED NATIONS REHABILITATION RELIEF ADM. Dr. Crabtree	V. D. CONTROL IN INDUSTRY Dr. G. H. Gehrmann Med. Dir., Du Pont		MOVING PICTURES				PUBLIC HEALTH DENTAL PROGRAM Dr. Knutson		INDIVIDUAL CONFERENCE			
THURSDAY July 27	MEDICAL CARE PANEL Dr. R. C. Williams			Dr. Mountin		Mr. Perrott		MOVING PICTURES				CHILDREN'S BUREAU MATERNAL AND CHILD HEALTH Dr. S. S. Deitrick, Asst. Dir.		PLANNED PARENTHOOD Dr. Kenneth Rose	
FRIDAY July 28	FILM STATE SANITATION Mr. Tisdale		WAR ACTIVITIES STATES RELATIONS DIV. Dr. Mountin			MOVING PICTURES				GRANTS IN AID PROGRAM Dr. Mountin		INDIVIDUAL CONFERENCES			
SATURDAY July 29	REVIEW QUESTIONS Staff			CLINIC			MOVING PICTURES				FIELD ASSIGNMENTS Dr. C. L. Williams, Jr.				

## FOURTH WEEK

MONDAY July 31	9:00 - 9:30	9:30 - 10:15	10:30 - 11:15	11:30 - 12:30	NOON RECESS	1:30 - 2:00	2:00 - 2:45	3:00 - 3:45	4:00 - 5:00
	9:30	FEDERAL HOUSING Mr. Pond	ACTIVITIES OF A STATE HEALTH DEPT. LABORATORY Dr. Perry	REVIEW PROBLEMS TRAVEL MISC. Staff		PLANS FOR HEALTH FACILITIES Dr. Hoge	INFIRMARIES AND PHYSICIAN RELOCATIONS Dr. Chisolm	CONFERENCE PERIOD	
TUESDAY August 1	PRESENTATION - WAR AREA PROBLEMS Class				NOON RECESS	CONFERENCE PERIOD			
WEDNESDAY August 2	PRESENTATION - WAR AREA PROBLEMS Class					CONFERENCE PERIOD			
THURSDAY August 3	FINAL EXAMINATION				NOON RECESS	CONFERENCE PERIOD			







